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Original Articles

The Treatment of Bronchial Asthma[1]

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The treatment of bronchial asthma is one of the most perplexing problems which confronts the general practitioner. In the past our inadequate conception of the etiology and pathology of the disease made our therapeutic measures rest upon an empiric rather than a scientific basis. To-day the recognition of the importance of protein sensitization as a factor in at least one-half of the cases has led to a more rational treatment than has heretofore been possible. In most patients there are many factors operative in the etiology, and the success in treatment is proportional to the uncovering and correction of these multiple factors. Before discussing treatment, therefore, let us consider briefly our modern conception of the pathology and etiology of the disease.

The pathologic changes in the bronchi and lungs are neither constant nor characteristic. In cases of long standing, emphysema is frequently found. Pathologic changes in the bronchi, however, are uncommon in spite of the long duration in some instances of the disease. Thus Kamchorn and Ellis's *(American Journal of the Medical Sciences,* 1921, clxi, 525) patient had asthmatic attacks increasing in frequency from childhood to the age of fifty-two, when he died during an attack, and yet the bronchial tubes showed no greater histologic changes than might develop in a few days during an acute inflammation without asthma. Ellis *(American Journal of the Medical Sciences,* 1908, cxxxvi, 407, and 1921, clxi, 525) concludes from data from ten necropsies following death during an attack that nothing in the histology of the bronchi explains the course of bronchial asthma. Ellis's studies would seem to lend weight indirectly to the theory of spasm of the bronchial muscles, which now seems to be fairly generally accepted.

Of interest as bearing upon the etiology as well as the pathology of the disease, is the case reported by Boughton *(Journal American Medical Association,* 1919, lxxiii, 1912) in which sudden death occurred following the injection of one minim of horse serum used as a desensitizing agent. The subject was an otherwise healthy man who had suffered from asthma for about twelve years whenever he came in contact with horses. The effect of the injection of that minute quantity of serum was a typical at-

[1]From the Department of Medicine, Jefferson Medical College. Read before the Lancaster County Medical Society, July 6, 1921.

tack of bronchial asthma which terminated fatally in forty-five minutes. The microscopic examination of the lungs showed slight, questionable catarrhal bronchitis and emphysema. The lesions as found in Boughton's patient are not unlike those quite constantly found in animals dying from anaphylactic shock. In fact the clinical manifestations of bronchial asthma are not unlike the anaphylactic phenomena observed in animals. It is upon this basis that we have constructed largely our modern conception of the disease. Certain cases, such as Boughton's, come definitely within the category of anaphylactic phenomena. In others the relationship, though oftentimes assumed, is less clear. In some the anaphylactic factor is subordinate to other factors whose causative relation is evident by the disappearance of the asthma with their removal—*e.g.*, the cessation of asthma after the removal of a nasal polyp, etc., etc. For the present moment let us consider bronchial asthma from the viewpoint of an anaphylactic phenomenon.

In anaphylaxis the following phenomena occur in the experimental animal. When a foreign protein (animal, vegetable, or bacterial) is introduced into the body (beneath the skin, in the serous cavities, in a blood-vessel, and in some cases of feeding), there appears after a definite interval a marked susceptibility to a second introduction of the same protein. It is thus a specific reaction. The second injection, which otherwise would have been harmless, produces violent symptoms of illness and often death. The reaction studied in guinea-pigs reveals restlessness, sneezing, cough, dyspnea, frequent urination, etc. The chest wall seems immobilized. Later shallow, irregular, spasmodic efforts take place. This, as Auer and Lewis have shown, is due to spasm of the smaller bronchioles with more or less imprisonment of the air in the lungs. An acute emphysema of the lungs is produced. If death occurs it is largely respiratory, the heart continuing to beat after respiration has stopped. If the animal survives it is desensitized for a time, but the desensitization is transitory — usually about three weeks in the guinea-pig (Otto). The modern tendency is to consider asthma basically as an anaphylactic phenomenon. Sensitiveness to a given protein or group of proteins may disappear, due to transitory antianaphylaxis. The paroxysms may disappear because of the removal of the inoculable protein. In most cases of asthma the individual is sensitive to a number of proteins. In other words, multiple sensitization, rather than sensitization to a single protein substance, is the rule. In one-half of the cases it is possible to demonstrate the sensitiveness. In the remainder sensitiveness may be present, but cannot be demonstrated. In a few it is distinctly subordinate to other factors which will be dealt with in discussing treatment.

The proteins to which a patient may be sensitive belong in five groups: (1) Pollens; (2) foods; (3) animal hairs and dandruff; (4) bacterial; and (5) dust. These proteins enter the body by absorption from the respiratory mucous membrane (inhalation) and through the gastrointestinal tract (ingestion), through the skin (inoculation), or by infection anywhere in the body, but especially about the mouth, upper respiratory tract, and lungs. Inhalation is the method by which sensitization occurs in the instances of pollens, animal emanations and hairs, and various kinds of dust.

Treatment of the Asthmatic.—The management of the asthmatic patient varies somewhat as to whether we see him during an attack or in the interval. The measures used during the attack are directed toward relieving the bronchostenosis. The measures between the attacks are directed toward discovering the exciting factor operating in precipitating the paroxysm. Briefly, the measures used for the former are epinephrine, atropine, morphine, amyl nitrite, nitroglycerin, and inhalations of chloroform. Calcium lactate in 10-grain doses every four hours may be useful in allaying nervous excitability. The prompt administration of an active saline cathartic, such as Epsom salts, is frequently neglected, though most important. Of all the various remedies useful in an acute attack epi-

nephrine by hypodermic injection gives the most striking results "when it works." In the writers' experience small doses *(e.g.,* 5 to 10 minims of a 1:1000 solution) are just as effective as large doses, and more than one dose is of little avail if the first fails. The action of epinephrine is probably by stimulation of bronchodilator (sympathetic) nerve endings. Park in 1912 showed that when this drug was applied to the excised rings of the bronchi of the ox, even in concentration as low as 1 to 10 million, relaxation occurs without primary constriction. As Bastedo points out, the rule that a drug acts best when the condition opposing it is extreme makes it peculiarly valuable in bronchial asthma. The effect upon the bronchi is out of proportion to the effect elsewhere, and is often evident even when the degree of arterial pressure is not affected in a measurable degree.

When epinephrine fails morphine and atropine are our most serviceable remedies. Atropine acts as an antispasmodic in a different way from epinephrine. It depresses the peripheral sympathetic (vagus) nerves in the lungs. In the same way the other members of the solanaceæ—stramonium and hyoscyamus—lobelia and amyl nitrite may be useful. Recently benzyl benzoate has attracted considerable attention as a result of the work of Macht *(Southern Medical Journal,* 1919, ii, 367). In an analysis of 150 cases of asthma he found that the benzyl benzoate treatment was beneficial in 75 per cent. In some the results were very striking and were equaled only by those obtained through the injections of epinephrine. In some cases benefit was obtained when epinephrine, the opiates, and other remedies failed. The cases treated were both adults and children, and in the latter the results were oftentimes most striking. In our experience the drug has been found useful, but must be given in larger doses than commonly advised. In an adult one or two teaspoonfuls of the 20-per-cent solution every three or four hours for some days may be necessary.

Many other drugs have been advised in the therapy of bronchial asthma; most of them have been discarded excepting one, which is frequently used empirically and with some success—potassium iodide. Given over a considerable period of time it seems to reduce the frequency and severity of attacks.

Sometimes during an attack, certainly after the severe paroxysm has subsided, the physician should endeavor to ascertain the causative factors in the production of the attacks. Is the case one which is due to hypersensitiveness to a foreign protein? What collateral factors are present and what bearing have they on the asthma? In the effort to answer the first we inquire as follows:

1. *The age when the asthma began.* The younger the patient when the asthma began, the more likely the factor of protein sensitization. An onset before five years renders protein sensitiveness a most likely factor. Ninety per cent is about the frequency of protein sensitization in asthmatics whose attacks began in early childhood. An onset after forty years usually means that there is some factor other than protein sensitiveness as a cause. After forty great care must be exercised not to confuse with true asthma the dyspneas of other cause such as cardiac and renal disease, emphysema, etc.

Bacteria are frequently a cause later in life, and focal infection must be investigated.

2. *The time of occurence of the attack.* If the attacks are seasonal there is probably a pollen sensitization. These patients often give a history of associated pollen rhinitis. Later, with the development of multiple sensitization, *e.g.,* pollens plus bacteria, etc., the seasonal character may be replaced by all-year asthma. Again, the asthma following acute bronchitis may simulate the seasonal incidence of the pollen types due to the frequency of acute respiratory infections at certain times of the year, *e.g.,* the spring and fall. In this group the history is that of recurring colds or an acute bronchitis which is associated with or followed by asthma. Bacteria are

among the causative factors in these cases. The sputum should be carefully studied. Nocturnal asthma, only, may be due to sleeping on a feather pillow, or as in one of our cases, to "cat hair," the patient being asthmatic at night when a cat slept in the same bed, but free during the day while at work.

3. *Environment, occupation, habits, association with animals.* Dust undoubtedly plays an important part in the etiology of asthma. Inquiry should be made in regard to the presence and character of the dust in any given occupation. Why one individual should become sensitive to the dust and another not is difficult to explain. We have seen asthma in a textile worker disappear after change of occupation. Likewise asthma disappeared with change of occupation in a pillow-maker who was sensitive to goose feathers. Bakers have asthma from flour dust; polishers from wood and other dusts. Domestic animals, *e.g.,* horses, rabbits, etc., may be the cause of human sensitization to the hair proteins. Hostlers and draymen get asthma from contact with horses. One physician had to give up laboratory work because he was sensitive to the emanations from laboratory animals. Other dust contacts occur in the sleeping on feather pillows, use of woolen blankets, wearing of furs, use of face powders, etc., etc.

4. *The dietary habits of patients.* An inquiry into the relationship of the asthmatic attacks to the ingestion of food is particularly necessary in those patients whose asthma began in early life. Some of these patients will not be aware of any relationship, but many learn that certain foods are directly causative of the asthmatic attack; or are not tolerated because of other manifestations, such as vomiting, diarrhea, or dermatitis. We have been struck with the frequency of the history of eczema in early life in those patients with food asthma later in life. The foods, in the order of their etiologic importance, are the cereals, principally wheat, eggs, potatoes, and sea food. Milk and the meats are at the end of the list and less provocative than generally supposed. In not a few cases some unsuspected article, such as mustard, pepper, banana, strawberries, nuts, coffee, etc., may be the etiologic factor.

5. *Foci of infection.* In every asthmatic patient search should be made for foci of infection—chronic rhinitis, sinusitis, diseased tonsils, abscessed teeth, gastrointestinal infection, etc., etc. The eradication of these foci with the use of an autogenous vaccine is of vital importance in the treatment of the asthmatic.

6. *Skin tests.* To aid in the determination of the causative proteins small cuts ⅛ to ¼ inch long are made on the flexor surface of the forearm with a sharp scalpel, not deep enough to draw blood and yet deep enough to penetrate the skin. The pollen, food, animal hair and bacterial proteins to be used are placed upon the cut, and if in powdered form dissolved in a drop of a decinormal potassium hydrate solution. A positive skin test occurs within fifteen minutes to one-half hour, and consists of an urticarial wheal surrounding the cut with a large or small zone of redness beyond the elevation. There may be some tingling or itching. These reactions are specific. The skin tests are most easily performed and most reliable with the pollens and animal hair proteins, less so with the foods, and least with the bacteria. In fact we have discarded skin testing for bacterial protein sensitiveness. We have had no experience with the intradermic method of testing. We can see no advantage over the technique as given.

Now, having determined the protein sensitiveness in a given case, our treatment is as follows:

1. If a pollen, desensitize preferably in advance of the pollen season with increasing doses of the pollen dilution, beginning with a dose which produces no reaction. Ten or twelve injections at five- or seven-day intervals constitute a course of treatment. Removal from the pollen environment is desirable. If the patient reacts to a number of pollens, select the one giving the most marked reaction for the desensitizing treatment. *It is inadvisable to use multiple pol-*

len injections, which resemble the old shotgun prescriptions.

2. If a food, remove the food from the diet. Desensitization is not often practical. It works is some case, *e.g.,* eggs, especially in younger patients.

3. If animal hair, remove the source of the protein. It may be necessary to get rid of the dog or cat, change the occupation, stop riding horseback, change the feather pillow to a floss pillow, stop wearing furs, etc., etc. It is possible to desensitize as in the case of the pollens and by a similar method.

4. If a bacterial protein sensitization, remove the focus of infection and use an autogenous vaccine.

5. If a dust contact, remove from dusty environment. (See previous paragraph.)

Vaccine treatment is indicated in most cases of asthma. In those instances in which sensitization seems to be primarily bacterial, its use is attended by the largest percentage of good results. In this group Walker *(Archives Internal Medicine,* 1919, xxiii, 220) obtained relief in 75 per cent and improvement in 21 per cent. Among other sensitive groups, *e.g.,* the pollens, animal emanations, foods, etc., there is a frequent benefit from the use of vaccines because of superimposed bacterial infection, which, if it does not produce sensitization of itself, prolongs or precipitates attacks by reason of the local and general changes which such infection induces. In the nonsensitive group the vaccines are less valuable. They are a distinct help, however—to wit, 40 per cent relieved and 20 per cent improved in the patients studied by Walker. An autogenous vaccine made from the sputum, or from an infected tooth, nasal sinus, etc., is preferable to a stock vaccine. The permanency of relief from vaccines depends upon the type of case in which they are used. In the straight bacterial cases it may be for a number of months. Second and third courses of vaccine therapy may at times be indicated, and our experience has coincided with that of Walker in that such secondary courses may be of more benefit than the first. In several instances under observation an almost constant vaccine therapy seems necessary to keep the patients free from asthma.

Among asthmatics the physician finds not infrequently a "neurotic background," if one may use such a term. If there is not a family tendency to asthma, or hay-fever, or urticaria, etc., significant of an inherited tendency to protein sensitization, there may be a neurotic history, *e. g.,* of epilepsy, migraine, and nervous or mental disease. A period of rest in bed with attention to the diet, or a regulation of the rest and exercise, etc., is of prime importance in those with subnormal nervous reserve—the neurotic group.

Just how far such an underlying neurotic state can go beyond predisposing to asthma is difficult to state, and yet it is recorded that asthmatic paroxysms have been provoked in such individuals by the smelling of an artificial rose, or by the occurrence of fright, menses, etc. The older writers were fond of speaking of asthma as a reflex neurosis, and quote its disappearance after the removal of nasal polypi, impacted teeth, etc. It is more likely that by these operations foci of infection were removed, thereby benefiting the patients. This we believe to be the real explanation of improvement and recovery following nasal operations generally. There can be no doubt that the presence of renal or cardiac disease may precipitate or aggravate the asthmatic attack in a victim of the two conditions. Certainly the correction of cardiac and renal defects, in so far as that is possible, is indicated in every asthmatic.

A point of considerable importance is the care of the gastrointestinal tract. A simple, easily digestible diet with attention to the emptying of the bowel is necessary in all cases. Dietetic errors, constipation, flatulency, etc., all predispose to asthmatic attacks. This relationship caused the older writers to speak of gastric, dyspeptic, or intestinal asthma.

In conclusion, we wish to emphasize that the successful treatment of asthma is possible in a fairly large percentage of cases

if the time is given to what amounts to a rather exhaustive study of the history, symptoms, and physical condition of the patient, not only during the paroxysm but in the interval between the attacks. Some of the failure to treat asthma successfully has been because of incorrect diagnosis. In our clinic at the Jefferson Chest Hospital we have come across a number of patients referred as asthmatics who have been found to be instances of cardiac disease, renal disease, foreign body in the bronchus, fibroid tuberculosis, emphysema and chronic bronchitis, thymic enlargement, intrathoracic goitre, mediastinal tumor, tumor of the lung, aneurism, etc., etc.

Basal Metabolism—Its Application to Internal Medicine

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Metabolism as defined by DuBois[1] "includes the absorption of foods, their oxidation and transformation into body constituents, and also the later oxidation of these tissues. Such are the energy exchanges of the body tissues taking place with the consumption of oxygen and the formation of carbon dioxide, these gases being carried to and from the blood by means of the respiratory apparatus."

It is very obvious, then, that the rate of metabolism must vary greatly, depending upon the character and amount of food ingested and upon exercise and the many activities of the body.

The idea that a number of diseases are due to disorders of metabolism or have, as part of their symptom-complex, evidences of disturbances of the normal metabolic rate is not by any means a new one. In order that the rate of metabolism shall be expressed in terms that may be used as a means of comparison of one individual with another, or the rate of the same individual under different conditions, it is necessary to determine the rate of metabolism under certain definite conditions. To meet the requirements the minimum heat production of the body is estimated fourteen or more hours after taking food (in the postabsorptive period) with the subject in the state of complete physical and mental rest. The result thus obtained is termed the basal metabolism rate.

The basal metabolism rate may be determined by one of two methods, the older, direct calorimetry, and the more recent, indirect calorimetry. The former method requires expensive, complicated apparatus, considerable experience and training, is time-consuming in making the determination, thereby confining this method to research laboratories. The complexity of the method prevents its liberal use in studying metabolism in groups of patients. The results, however, are more accurate than by those obtained by the indirect calorimeter. The research laboratory has made an important contribution to the clinical laboratory by making the indirect calorimeter practicable.

The indirect methods of estimating basal metabolic rates have become very popular, largely on account of the simple types of apparatus which have been devised, and have thus overcome the objection made to the extensive use of the direct method.

Regarding the results obtained by estimating basal metabolism by direct or indirect calorimetry, experiments made by workers indicate so little variation that the error which is common to all by the indirect method is negligible.

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[1]The Basal Energy Requirement of Man. By Dr. Eugene F. Dubois, in the *Journal of the Washington Academy of Sciences*, June 4, 1916.

Indirect calorimetry, to which we shall limit this discussion entirely, is the determination of the heat production by ascertaining the amount of oxygen utilized and the quantity of carbon dioxide and nitrogen eliminated. As stated in the definition of basal metabolism rate, this determination must be made in the postabsorptive period with complete mental and physical rest.

Recent observation showed that there is less danger of error in computing heat production from the oxygen consumption alone, thereby further simplifying the procedure.

From the amount of oxygen consumed in a given unit of time, usually a ten or fifteen minute period, is estimated the number of calories of heat produced per square meter of body surface. The surface area of each subject studied can be determined readily according to DuBois's chart, having ascertained the actual height and weight. All known methods of estimating body surface are open to criticism, and Means and Woodwell[1] in their investigation are not able to find any other method that appears to possess material advantage over DuBois's method. This result is further corrected for temperature and barometric pressure changes and reduced to the amount of oxygen consumed in periods of one minute.

DuBois has determined the basal metabolism rate in a large number of normal individuals of both sexes and of different ages. His studies have furnished standard rates for comparison. These normal rates compared with those obtained from subjects studied, if increased or decreased, are expressed in terms of percentage of the normal. Thus a 25-per-cent increase would be termed basal metabolic rate of +25, and 25-per-cent decrease would be termed a basal metabolic rate of —25.

Since it has been shown that normal individuals vary within a range of 15 per cent either above or below normal figures given by DuBois, only values above +15 or below —15 are considered abnormal.

A number of kinds of apparatus are now available, and no attempt will be made to cover the technique or to supply descriptions of the different types. Emphasis is laid upon a thorough understanding of fundamentals of metabolism, selecting the proper time and conditions under which the metabolism test is to be performed and the importance of checking up the results obtained. With these precautions observed the author, whose experience has been limited to the Sanborn Benedict portable apparatus, is convinced of the practical value of the determination of the basal metabolism rate as an aid in the investigation, diagnosis, treatment, and prognosis of an important group of diseases.

All the results obtained must be considered under the following conditions:

1. The tendency often is to attach too great importance to a laboratory finding to the exclusion of a careful investigation into the patient's history and symptoms, and failure to make a careful physical examination. The laboratory evidence is considered a diagnosis, when it is but a report of the result obtained from a single procedure. No laboratory finding is to be considered except with all other evidence that can be secured. The basal metabolism estimation is a laboratory report.

2. That the rate of basal metabolism has been made by a competent worker, familiar with disease (preferably a medical man), and one fully informed as to the proper conditions under which the test should or should not be made. The observer must further thoroughly understand the use of the apparatus.

3. That, if possible, before a report is rendered at least three observations be made, preferably on successive days. If the conditions are practically the same there will be but slight variation in the findings.

The development of the simple types of apparatus, which requires on the average about one hour of time to make a determination of the rate of basal metabolism, has stimulated a large number of clinicians to enter the field of basal metabolism study. As more workers become engaged in the work additional avenues of investigation

[1] *Archives of Internal Medicine*, vol. 27, No. 5, page 619.

will be opened, and the value of these observations be increased in number and in usefulness.

Of what value may be the determination of the basal metabolism rate in the light of our present information?

1. As an aid in the recognition of diseases which have increased or decreased metabolic rates, and to aid in the differential diagnosis of conditions which resemble diseases that have abnormal metabolic rates from those with normal metabolic rates.

2. As a guide to medical, surgical, *x*-ray, and radium treatments, and to determine their effectiveness.

The determination of the basal metabolic rate finds its widest field of usefulness today in the study and treatment of disturbances of the thyroid gland. Frederick Müller in 1893 recognized that there was increased protein destruction in overactive thyroid glands and consequently an increased metabolic rate. Since that time numerous investigations have been conducted along avenues opened by Müller. When the thyroid gland is overactive an increased basal metabolic rate is present, and underactivity of the thyroid gland results in a decreased rate.

The estimation of the rate of basal metabolism under the following conditions is most important in their diagnosis and treatment:

1. Enlarged thyroid gland with symptoms of hyperthyroidism.

2. Enlarged thyroid gland without symptoms.

3. Enlarged thyroid gland with symptoms resembling those present in hyperthyroidism but due to causes other than hyperthyroidism.

4. No apparent enlargement of the thyroid with other symptoms of hyperthyroidism.

5. Enlargement due to tumors of the thyroid gland in which there is either no change or an increase or decrease in the activity of the thyroid gland.

6. Enlarged thyroid gland with symptoms of hypoactivity of the thyroid gland.

7. No apparent change in the size of the thyroid gland with symptoms of hypothyroidism.

The determination of the basal metabolic rate should be made in every case of goitre with impaired health with the view of determining if the illness is dependent upon the goitre or whether due to other causes. Unquestionably there are individuals in ill health, with or without enlargement of the thyroid gland, with other symptoms commonly found in hyperthyroidism whose recognition is difficult in the absence of the estimation of the basal metabolic rate.

The interference with so vital an organ as the thyroid gland especially by surgical procedure has resulted in hypothyroidism having been added to the disease actually responsible for the symptoms attributed to disordered action of the thyroid gland. To this group belongs the large number of cases of so-called disordered action of the heart seen in soldiers during the recent war, patients suffering from neurocirculatory asthenia, nervousness, weakness, loss in weight, incipient tuberculosis, syphilis, and gastrointestinal disturbances. These conditions are rendered more difficult to diagnose if a functional enlargement of the thyroid gland is present. The determination of the basal metabolic rate is of the greatest help in ruling out thyroid gland etiology and assisting therefore in directing the proper course of treatment.

A large number of the thyroid gland enlargements, especially in young women, in women during menstrual period or during pregnancy, which are functional in character cause considerable anxiety and worry to the individual. A basal metabolism determination may be of the greatest value, allaying unnecessary fears by finding a normal basal metabolic rate. In the absence of the knowledge of the basal metabolism rate, normal thyroid glands have been removed and hypothyroidism has resulted.

In tumors of the thyroid gland the nature of the growth may be such as to destroy the gland tissue and produce a condition of hyperthyroidism, or on the other hand

stimulate the thyroid to increased activity. Some tumors produce no variation in the basal metabolic rate.

There is also another group of individuals who present all or some of the symptoms of hyperthyroidism or hypothyroidism, but in which the thyroid gland is not palpable. The estimation of the basal metabolic rate under these conditions reveals the actual activity of the gland.

Enlargement of the gland may accompany hypothyroidism, and under such conditions the determination of the basal metabolic rate will be of the greatest help in prescribing the proper course of treatment.

In all suspected cases of underactivity of the gland in which but few or only a single symptom of hypothyroidism may be present, the determination of the basal metabolic rate may throw light on the underlying condition.

In exophthalmic goitre the determination of basal metabolic rate is of help in deciding upon the kind of treatment, the frequency of treatment, and the result of treatment, the justification and safety of surgical procedures, the severity of the intoxication, and the prognosis.

In polyglandular disturbances the estimation of the basal metabolic rate may be of the greatest help, especially in determining that other glands than the thyroid are largely at fault.

One can conceive that in many diseased conditions there are present phenomena which of themselves will increase the basal metabolic rate—for example, chills, sweats, fever, dyspnea, exercise, food, emotion, apprehension, anger, fright, tremor, menstruation—and these in themselves may account for variations of basal metabolic rate.

In thyroid disease one cannot but be convinced that the determination of the basal metabolic rate has been a distinct step forword in the assistance it gives in the direct diagnosis of diseases of the thyroid gland and in the differential of conditions resembling it and of the effectiveness of treatment and the prognosis. Certainly this procedure is entitled to take its proper place among the valuable laboratory tests. The problems associated with the large group of diseases of the thyroid are far from solution, but if any progress has been made recently it has come from the increased interest which basal metabolism estimation has stimulated.

The following is a list of the range of metabolic rates found in various diseased conditions:

BASAL METABOLISM AS REPORTED IN VARIOUS DISEASES.[1]

	Per cent basal metabolism above or below average normal.		
Normal	−15	to	+15
Obesity	−14	to	+10
Diabetes mellitus:			
Severe	−19	to	+23
After fasting	−36	(lowest observed)	
Emaciated	−37	to	−10
Cardiorenal without dyspnea	−10	to	+10
Cardiorenal with dyspnea	+25	to	+50
Nephritis with edema	−40	to	+14
Nephritis without edema	+ 2	to	+29
Pernicious anemia	+ 2	to	+33
Leukemia	+21	to	+123
Typhoid fever		as high as	+50
Tuberculosis (temperature about 104° F.)	+15	to	+35
Tuberculosis (no fever)	−33	to	+15
Prolonged undernutrition	−30	to	−10
Exophthalmic goitre:			
Very mild	+15	to	+30
Mild	+30	to	+50
Severe	+50	to	+75
Very severe		over	+75
Cretinism and myxedema	−40	to	−15

These figures have been taken largely from the publication of E. F. Dubois and his collaborators, though other sources have been consulted.

There is no end to the additional information which may come to us by the further and continued study of the basal metabolism of these and other diseases.

[1]The Medical Clinics of North America, 1921, vol. 4, No. 5.

Wiring and Electrolysis for Aortic Aneurism

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In Volume II of Oxford Medicine, McKenzie and Girdwood in their article on Aneurism state that a great many expedients have been used to facilitate the formation of the clot for influencing the course of the disease. It is doubtful if any of these are of value. Osler in the eighth edition of his text-book gives a brief paragraph upon the results of the introduction of foreign bodies into the sac of an aneurism. He speaks of the danger of the operation and the difficulty of determining whether the aneurism is saccular or not. He does not comment excepting to mention that some of the cases are successful.

Occasionally reports appear in the journals of aneurisms that have been wired, but they are scanty and often contain an apologetic note; this in spite of the fact that Dr. H. A. Hare of this city has wired thirty-five cases without a single accident and with almost uniformly good results, and I can add to this sixteen cases that I have personally wired without a single accident, and with no deaths and several excellent results—at least no deaths as a result of wiring, although some of these patients must subsequently have died. As my patients have, as a rule, been hospital cases, in nearly all instances they have disappeared, and no subsequent information could be obtained.

One patient was seen six months after the wiring pushing a heavy huckster wagon on Delaware Avenue. He was interviewed and reported that he felt well and strong. He had had a saccular aneurism extending to the right from the transverse portion of the aorta.

Still another case has been kept under observation due to his rather frequent admissions to the alcoholic ward of the Philadelphia Hospital. Nine years ago a subclavian aneurism was wired. As the pulsation persisted, one year later it was wired a second time. When seen recently there was very faint pulsation in the sac. The man has done more or less laboring work and lived, apparently, a dissipated life.

In this paper I shall report the history of a case that it has been possible to follow for a period of three years. It seems justifiable to place it upon record for the reason that at the time the operation was undertaken it was generally conceded that the patient could live but a few days, an opinion which may have been mistaken, but was shared by all who examined him. Improvement began immediately and continued progressively up to the present time, so that the patient is now and has been for more than two years actively engaged in an arduous and important business.

To begin therefore with the conclusions instead of placing them at the end, it may be confidently asserted that in this particular instance the risk involved in wiring the aneurism was justified, the results exceeded our expectations, and the treatment deserves much more consideration than has hitherto been accorded to it.

At the time of the operation the patient was forty-four years of age. The family history was unimportant excepting that his wife had had three miscarriages and no living children. He. had had typhoid at twenty-two years, some dental operation in 1907, and had had many minor injuries. For two years he suffered from frequent colds with cough and expectoration, and much dyspnea and palpitation of the heart. In January, 1918, the tonsils were removed. The symptoms of aneurism began in the summer of 1917. He had dyspnea, pain in the chest, and he stopped playing golf. February, 1918, he developed a severe cough. His condition rapidly progressed, the dyspnea increased to orthopnea, and when examined the patient was flushed and slightly cyanosed. The veins of the head

and neck were distended. There was a large pulsating elevation in the upper portion of the right chest extending from the clavicle to the fourth rib, and from the right border of the sternum about 2 cm. beyond the right midclavicular line. The pulsation was powerful, both lifting and expansile. There was a dull systolic and diastolic note heard over it, but there was no thrill nor bruit. The second aortic sound was accentuated, and Sibson's sign was present. There was a distinct tracheal tug. The patient complained of intolerable and constant pain in the upper part of the right thorax. Respiration was difficult. There was slight dysphagia and edema of the feet.

He was transferred to the Base Hospital at Camp Wheeler, where I was then on service, and *x*-rays were taken by Major Wheat. Wiring was then suggested and accepted by the patient and his physicians. It required four days to secure the needle and 26 ft. of wire made of a gold and platinum alloy.

The operation was then performed with the assistance of a neurologist who managed the electricity. No difficulty whatever was experienced. The needle was inserted into the aneurism without a local anesthetic and the puncture caused practically no pain. The tissues in this region were tense and probably partially numbed. The wire was passed in rapidly. Altogether about fifteen minutes were required for its insertion. As is usually the case there was difficulty with the electricity. No current apparently passed until about fifty milliamperes were reached. This caused distinct spasm and pain. After four trials it was discontinued, but probably the patient had about as much effect from the electrical current as can be obtained. Immediately there was relief from pain. The wiring was done at 11 o'clock. The same night he slept horizontally without an opiate and

PLATE 1.—Taken May 20, 1918, just before wiring.

without excessive dyspnea. Within a week the antisyphilitic treatment was commenced. By this time the patient was sitting up and in two weeks he returned to his home in the city, coming to the hospital about once a week to receive injections of salvarsan.

There were no setbacks nor relapses. The condition was steadily progressive. The dyspnea disappeared. The patient was not, however, permitted to take any severe form of exertion. The dysphagia also ceased, and when last seen at the camp, about three months after the wiring, he insisted that he felt well and was anxious to return to work.

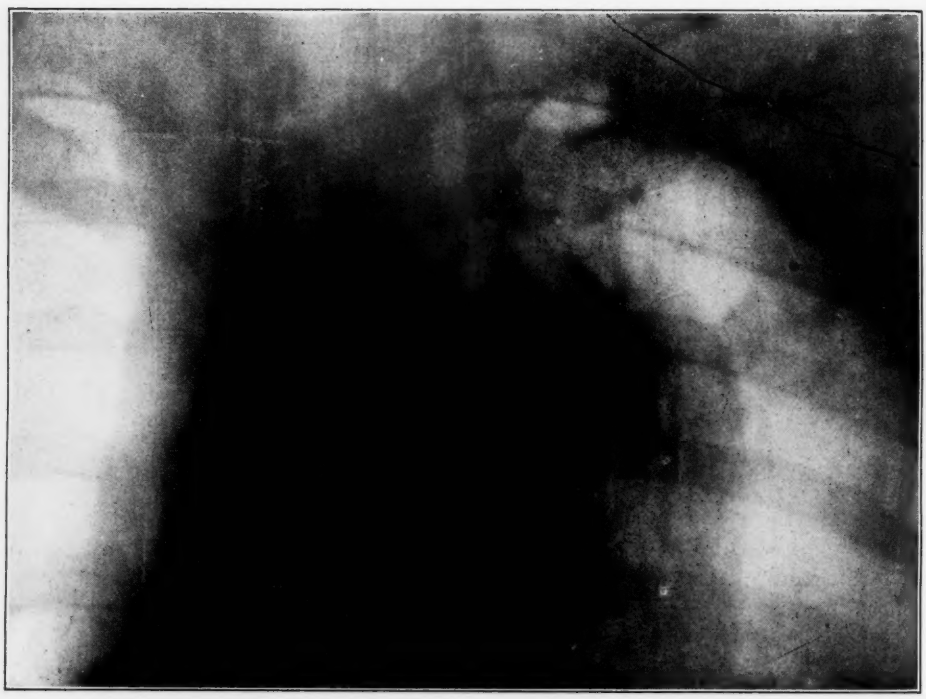

PLATE 2.—Taken May 24, 1918, just after wiring.

From time to time satisfactory reports were received. On the 6th of December, 1919, he came to Philadelphia to report to me. His weight then was 185 pounds. He complained of a slight cold, cough, and expectoration. At this time his red cells were 4,720,000, white blood cells 14,200. The sputum was examined and was negative. The urine contained mucus, but was otherwise normal. The physical examination showed some herpes libialis, evidently recent, due to the cold; normal reaction of the pupils; slight lateral movement of the head synchronous with the pulse; apex beat in the sixth interspace; area of cardiac dulness extended from the midsternum to ½ cm. outside the left midclavicular line; there was a loud rough murmur heard best at the aortic cartilage and transmitted into the neck; no accentuated sounds; there was a distinct deviation of the trachea to the left and vigorous tracheal tug. The lungs and abdomen were normal. The knee-jerks were active.

The evidence regarding the Wassermann was contradictory. In Philadelphia it was taken and found to be four plus. Two Wassermann's, however, were taken in the south, one in Macon and one in Asheville, about the same time, and both were negative.

I have heard from him on several subsequent occasions, the last being March 12, 1921. Dr. Minor writes to me:

"As regarding measurements with the fluoroscope, they have stayed very much the same. There is an entire absence of symptoms. He is looking and feeling very well."

As the illustrations show, this patient had a very large aneurism. At the time of wiring it seemed as if he could live at most only a few weeks. The whole appearance of the case was changed by the wiring, and although it is questionable whether the syphilitic infection has been entirely cured, he has been restored to a life which, with the exception of outdoor sports, is as active as he has ever had. There can be no question in my mind that the beginning of this improvement was due solely to the wiring. It is hardly necessary to discuss the technique, but there are certain features upon which stress may be laid.

The needle must be of gold to hold the enamel. The wire must also be of an alloy of gold and platinum. I have recently wired an aneurism with gold wire and found it most unsatisfactory, on account of the difficulty of its insertion.

A local anesthetic is usually unnecessary, and I think undesirable, because it slightly increases the danger of a local infection. The pain of the puncture is not greater than that of a puncture for the inoculation of typhoid bacterin. A most scrupulous antisepsis should be observed. Although I have never known a local or general infection to occur, it is a possibility we must always bear in mind.

The greatest difficulty that I have experienced has been with the application of the electricity. This should always be done by an electrotherapeutic expert. The apparatus should be tested before it is employed. Even under these circumstances it will be found very difficult to get the

PLATE 3.—Taken May 11, 1921. Present condition. The contraction is not as much as would appear from these pictures because the first two were not taken with the tube at six feet distant as was the last.

correct amount of current. A large pad placed over the back will facilitate the electrical application considerably. I have been inclined to think that the initial dose is too low, and it is quite as satisfactory to start with fifteen or twenty milliamperes. This curtails the time of the operation and apparently does not in any way affect the result.

The results of the operation have almost invariably been immediate cessation of the pain, immediate improvement in the dyspnœa, and immediate reduction of the pulsation; the latter, however, has failed to occur in two of my cases, at least in the beginning.

The ultimate result as far as I have followed these cases, which has been in less than half, has been satisfactory. In the case that I here report, which has been followed most carefully, there has been, as the illustration shows, a distinct reduction in the size of the aneurism. The mechanism of this I do not understand. There is no evidence that organization occurs in an aneurismal clot. Probably there is a certain amount of contraction due possibly to inspissation of the clot. There is also doubtless some pressure from outside on the aneurismal sac, and when the blood fails to fill it and cause distention, there may be enough pressure outside to cause it to shrink. At any rate, in the course of three years a distinct shrinkage has evidently occurred.

The ultimate prognosis is a matter of speculation. A man with a condition of this kind may fall dead almost any time. Under favorable conditions there is no reason to suppose he may not live indefinitely, particularly if the syphilitic inflammatory process in the wall of the aneurism can be controlled by treatment.

If one may draw conclusions from a single case and from experience with 15 others, the following statements seem to be justified:

1. That the Moore-Corradi method of wiring aneurisms properly employed is harmless.

2. That in the majority of cases it relieves the objective symptoms almost immediately.

3. That objectively the patient improves and that the cardiac condition seems for a time to become better.

4. That the improvement is not impaired by antisyphilitic treatment, but distinctly increased.

5. Probably the antisyphilitic treatment is a valuable therapeutic measure in these cases, reducing the syphilitic inflammation in the wall of the artery that has brought about the aneurism, and when thoroughly administered improves the prognosis.

6. That there is no reason, even in severe cases of aneurism of the aorta, to regard the termination as likely to occur within a short period of time; that the prognosis therefore may in certain cases be favorable.

The Liberation of Free Salicylic Acid from Sodium Salicylate in the Circulation.

In the *Journal of Pharmacology and Experimental Therapeutics* for June, 1921, HANZLIK, in his conclusions, states:

1. Free salicylic acid is demonstrably liberated from sodium salicylate at a very low degree of acidity, namely, an acidity whose hydrogen-ion concentration corresponds to pH=6.7; more definitely at pH=6.5.

2. The presence of 25 per cent serum or plasma in salicylate "buffer" mixtures prevents the liberation of free salicylic acid at the high degree of acidity of pH=5.9.

3. Therefore, it is improbable that free salicylic acid could be demonstrated in the circulation during life.

4. This was fully confirmed on animals subjected to fatal asphyxia and whose cardiac and arterial bloods were rendered very slightly acid (pH=6.8 or 6.9).

5. Consequently, the theory that free salicylic acid, liberated by virtue of the greater CO_2 content of venous blood of the right heart, exerts an antiseptic action and prevents the development of a right-sided auriculoventricular (tricuspid) endocarditis in rheumatic fever is untenable. An explanation of this phenomenon must be sought elsewhere.

Editorial

THE PROPER ATTITUDE AS TO DIABETES MELLITUS.

As we have said before, the very common custom of examining urine with Fehling's test and getting a positive reaction often leads a physician to the statement that his patient has diabetes. It has been manifest for many years that a statement based upon such a foundation is very prone to be erroneous, and more recent investigations as to diabetes itself and as to the reducing substances which may be found in the urine prove that we should be most guarded in reaching a diagnosis and expressing an opinion until every fallacy has been, if possible, eliminated; or as has been recently expressed by Graham in the London *Lancet,* it is incorrect to say that every patient that passes a reducing substance in the urine is suffering from diabetes mellitus. Before such a conclusion is reached the nature and amount of the reducing substance must be investigated, and even if dextrose is present the diagnosis of diabetes mellitus is not necessarily correct. It is never to be forgotten that an old Fehling solution may reduce itself and that errors in the technique of carrying out the test may give erroneous conclusions. These errors are to be particularly guarded against if the reduction does not take place for a number of minutes.

The next step should be the use of the fermentation test with yeast to determine if the reducing substance will ferment, and if the physician can subject the urine to the polariscope, this method of investigation should be added. As uric acid, creatinine and salicyluric acid will reduce Fehling's solution, it is probably best to use Benedict's solution in the majority of cases.

Not long since in these columns we called attention to the possibility of lactose giving a reaction for sugar, and pointed out that Mathew had advised the use of the fermentation test to show that lactose and not dextrose was present. Lactosuria is practically met with only in nursing women or in those who have recently been nursing, and, therefore, is not prone to act as a complicating factor in the majority of cases. Levulose may, however, be present, is thought to be indicative of hepatic inadequacy, and its presence can only be differentiated from lactose by determining whether the solution is levulorotary or by certain chemical tests not commonly used by clinicians. It is important to remember that the presence of levulose in the urine does not indicate that a patient has diabetes mellitus and that a strict regulation of the diet will usually clear up a levulosuria.

In this connection we note with interest that Graham describes a class of cases to which he gives the name "diabetes innocens," which consist of a group, rarely met with, in which the loss of sugar is associated with no symptoms, the patient having glycosuria year in and year out without apparently any ill effect, and passing sometimes as much as 10 to 30 grammes a day, the amount of sugar, however, being little influenced by the intake. On the other hand, starvation for twenty-four hours in such cases may almost entirely eliminate the sugar from the urine. Without doubt many physicians have met with cases of glycosuria of this type and have done wisely in not applying the term diabetes to them even if the words "diabetes innocens" are used.

Graham thinks that the diagnostic points are as follows: Sugar is not present in each specimen, the urine only after meals containing sugar and the fasting urine not any. The amount of sugar bears some relation to the amount of carbohydrate, and there is a rapid disappearance of sugar with one

day of starvation. Again, the fact that an increase in the diet does not cause a reappearance of sugar for an indefinite period is of importance, and last of all, if sugar tolerance is tested with a full dose of sugar and the blood sugar estimated at the same time it will be found that no sugar is passed when the blood sugar is normal, but only when the blood sugar is high. In other words, it would appear that a major difference between so-called diabetes innocens and real diabetes is that the sugar threshold is very high in the mild type of case. Graham goes so far as to state that diabetes innocens needs no treatment, although he admits that if a patient is treated as a diabetic no harm will ensue.

He records one patient who thirty-five years ago was passing thirty grammes of sugar a day, the patient being a woman. Still another case in which a girl at the age of eight was watched for nine years. Both of them have continued very well and lead active lives with no restrictions. Nevertheless it is manifest that patients of this type should be a little more guarded in regard to their method of life than the average individual.

Concerning true active diabetes, Graham does not believe that the custom of dividing these cases into alimentary and pancreatic types is correct, but thinks that they should be divided into the mild type, the medium type, and the severe type. The mild type is a degree removed from diabetes innocens. It is met with most frequently in elderly people, as we all know, and in this connection a very interesting clinical point is to be recorded, namely, that sometimes it seems to be rather the result of a concomitant condition than the cause.

We are prone in the presence of a slowly developing gangrene to examine the urine for sugar and to conclude that diabetes is the cause, but just as soon as amputation is performed, unless secondary septicemia develops, the sugar may disappear and remain absent, and Graham states that in many cases of carbuncle associated with glycosuria the carbuncle tends to increase the sugar lost, and its cure, if possible, may result in a disappearance of the glycosuria.

Many of the patients belonging to the mild type have no symptoms until some complication arises, but in the medium type, often seen in young patients, the amount of sugar which is eliminated may be very large, and loss of energy and the presence of pruritus and thirst may be the predominant symptoms. A careful analysis of the blood sugar in these patients will show that it is always above the leak-point, and any error in diet immediately greatly increases the sugar loss. In the severe type, Graham would place those rather unusual cases in which a mild or medium case is suddenly converted into a severe one by an intervening illness or in which the disease itself is of very sudden onset. These latter cases are often so sudden that the patient can actually state the day upon which the disease began. Graham quotes Garrod as having seen a young woman who had become unconscious on the morning of his visit, yet had seemed well before that day. In these severe cases the amount of sugar eliminated may be very large.

We have met with instances in which quantities of sugar in the urine were far in excess of those quoted by Graham. He speaks of 200 to 300 grammes in twenty-four hours. We have met with several cases in which these amounts have been practically doubled. In many of these patients the blood sugar remains high notwithstanding the great quantities of sugar which are lost through the kidneys.

Finally, there is a type of case not directly referred to by Graham which deserves attention, namely, that type in which the quantity of sugar in the urine is comparatively slight, whereas the blood sugar may be inordinately high. This condition may be explained from one of two points of view: either the kidney has been driven so that it is exhausted and, therefore, its power of elimination is decreased, or, on the other hand, by some process the leak-point or renal threshold, has been materially raised, if not by fatigue or degenerative change, by some other process not clearly under-

stood. This type of case provides an exceedingly interesting source of study, viz., persistently high glycemia with persistently low glycosuria. It is becoming more and more evident that an examination of the blood whereby its sugar content may be estimated is possibly more important than a similar estimation of the sugar content in the urine.

ADRENALIN THE BEST REMEDY FOR THE UNTOWARD EFFECTS OF ARSPHENAMINE.

The development of disagreeable, dangerous or even fatal symptoms after the intravenous injection of one of the new arsenical preparations which are used in the treatment of syphilis is fortunately a rare occurrence, and this is perhaps the more remarkable in view of the carelessness with which these powerful drugs are sometimes used, both as to their preparation and as to an accurate knowledge of the state of the patient so far as his heart, kidneys, and other organs are concerned. Nevertheless every practitioner must appreciate that such an accident may develop, and he is wise to bear in mind the best remedy to be employed to combat the immediate symptoms, some of which are sometimes referred to as the nitritoid crisis.

It will be recalled that Ehrlich, some time before his death, directed, or expressed the belief, that in some of these cases the symptoms are due to a deficient secretion of adrenalin, and he advised that large doses of this substance be given hypodermically when diarrhea, suppression of urine, cyanosis, or coma followed the use of these products, and, furthermore, asserted that such a use of adrenalin will save desperately ill patients. So far as we know this opinion of the original producer of arsphenamine has not been controverted in the course of years, and it is interesting to note that it has been confirmed by more than one observer. Recently in *La Presse Médicale* of August 13, 1921, Milian, after pointing out that the technique of administration has a marked bearing on the danger of inducing a nitritoid crisis, expresses the following views: The use of a concentrated solution even of neoarsphenamine is prone to produce disaster. The reason for this is easy to understand. In all cases the injection should be slow. The time should not be less than one or two minutes. The crisis which is developed in from three to ten minutes after the injection is more severe if the injection is given rapidly than if used interruptedly and slowly and well diluted. Salt solution is far preferable to distilled water, which is hemolytic.

At the close of his discussion of the symptoms of this untoward manifestation of the influence of these remedies, he points out that while the intravenous injection of the adrenalin for the relief of the symptoms may cause headache, it also causes a slowing of the pulse, and that the use of even an infinitesimal dose of adrenalin has an extraordinary effect, the patient being saved from apparent death.

Finally he states that he who has seen these dangerous effects will rely on adrenalin and not resort to less useful remedies. His directions are that if the pulse is much quickened or the respiration is affected, the injection is to be stopped and the adrenalin given at once in salt solution by the vein, or intramuscularly into the buttocks or into the muscles of the front of the chest.

THE VALUE OF FOREIGN PROTEINS IN THE TREATMENT OF CHRONIC ARTHRITIS.

From time to time during the last decade a very considerable number of contributions to this subject have been made, and to most of those of importance we have called attention either in these pages or in the Progress department of the THERAPEUTIC GAZETTE.

We think it now may be stated as a fact that the intravenous or subcutaneous injection of foreign protein produces a therapeutic influence which cannot be denied, and while the pathological changes which

have taken place in many cases of chronic arthritis are so great that it is obvious that no method, either medical or surgical, can be curative in effect, nevertheless there is a large class of cases, both moderate and fairly far advanced, in which clinicians of undoubted reliability have obtained extraordinarily good results.

Our readers will remember that the foreign proteins which have been employed have been of the most varied character, from the use of egg-white to the injection of dead typhoid or other bacilli, and that in some respects it has seemed to make little difference what the source of the foreign protein was provided the proper dose for the individual case was given. This statement as to dose, which seems so obviously correct, is not as simple as it appears, because an extraordinary variation in the reactive ability of different patients has been found to exist, and also because doses which are so small as to produce no reaction in the sense of a chill and febrile movement have usually failed; and, on the other hand, doses which have been too large for the individual power of reaction have produced such severe effects as to seemingly jeopardize the patient or to produce such a degree of illness that both the physician and the sufferer dislike to continue the method.

At present, as we have already indicated, there is little indication that specific protein—that is, one derived from the invading microörganism—is of greater value than a non-specific protein, although therapeutically one would suppose that this would be true.

Some practitioners get excellent results not from the use of dead organisms, but from the employment of filtrates of such organisms, and during the last ten years these products have been widely employed under the name of phylacogens.

In a recent issue of the *Archives of Internal Medicine,* Snyder and Ramirez, after briefly reviewing some of the work which has been already done by them, make a further report upon this subject with special reference to the use of secondary proteose prepared from milk. They believe that there is a certain advantage to be obtained by avoiding dead typhoid bacilli or other dead organisms, because the dose is uncertain, the bacterial counts in vaccines being only approximate, and furthermore the protein content of different types of bacteria vary widely. Then, too, such an injection, if done intravenously, introduces into the blood not only proteins, but endotoxins which must be destroyed or eliminated, and which are of the nature of by-products or useless contamination. Last of all they point out that there is always the slight danger of introducing live organisms.

Referring once more to our own experience in this matter, we wish to emphasize the fact that a certain degree of reaction must be produced after each injection if beneficial effects are to be obtained. As Snyder and Ramirez have pointed out, if the initial dose is large enough to produce a chill it is not necessary to increase the dose as long as subsequent doses continue to produce a reaction which is satisfactory. When using typhoid bacilli they employ ten million; when using secondary proteose they employed from one-half to one grain, but these were intravenous doses, and when we have employed foreign proteins we have preferred the hypodermic method.

So far as their clinical results are concerned, they report that they have had charge of seventy cases of chronic arthritis; sixty were hospital cases and ten were private cases. Naturally these cases varied greatly in severity. Six of the patients are considered cured and are at work earning their living, having previously been helpless invalids. Two of them have a slight amount of deformity due to the presence of adhesions and bony changes. Their average percentage of cures of chronic arthritis is 8.5.

The time during which the arthritis exists is also an important factor. All of their cures occurred in patients who had been ill from arthritic conditions for less than two years. Amongst those patients who were only improved and who suffered from marked deformities, they state that the greatest benefit usually occurs in the

joints of the upper extremities. In this type 50 per cent showed considerable improvement in motion and in diminution of pain, whereas in the lower extremities only 25 per cent showed slight improvement.

This method of treatment in no way interferes with the routine methods of using the salicylates, colchicum, hot packs, and massage, but this warning is to be remembered, namely, that the intravenous injection of a foreign protein is contraindicated if tuberculosis is present in any form, in cases of very high arterial tension, and in patients with valvular or myocardial disease and ruptured compensation.

THE BEARING OF THE ADMINISTRATION OF ARSPHENAMINE AND NEOARSPHENAMINE UPON FURTHER INFECTION IN SYPHILIS.

Very recently Brown and Pearce have reported a study from the laboratories of the Rockefeller Institute for Medical Research bearing the title "Super-infection in Experimental Syphilis Following the Administration of Sub-curative Doses of Arsphenamine or Neoarsphenamine." While it is true that the subjects of their experiments were rabbits, nevertheless so far as we know there is no evidence to indicate the facts which they have accumulated do not hold true in the case of human beings.

After pointing out that it is generally held that a person infected with the virus of syphilis practically becomes immune to a second infection, they proceed to record the results which they have obtained, discussing the possibilities of second infection and the influence which the newer antisyphilitic remedies have in controlling it. In other words, the point which they endeavor to elucidate has been the question whether these therapeutic agents increase the resistance of an infected individual to reinfection. The general view as to reinfection, which we stated above, has at various times been thrown into doubt by the report of isolated instances in which a new primary lesion has developed in a person who is known to be a syphilitic from an infection at an earlier date.

It is not necessary at this point to detail the technique which was employed by these investigators, since those who are particularly interested in this part of their work can obtain their information from the *Journal of Experimental Medicine* of May 1, 1921. The point of interest to the general practitioner is that their work would seem to indicate that the existence of an infection with the spirochete of syphilis does not constitute a bar to the introduction and propagation of a second infection, and again it would appear that the diminution of virulence of the primary infection by the use of the new arsenical compounds rather increases the possibility of the second inoculation than diminishes it, provided the doses which have been employed have not been large enough to be distinctly curative in their influence. In other words, it would seem that the individual who has no treatment with the new arsenical compounds and who is exposed a second time to infection is less prone to obtain a second inoculation than one who has received these drugs in moderate amount. In the animals which they used they found these facts to be the case, namely, that untreated animals were highly refractory to second inoculation; that partly treated animals were, however, highly susceptible to a second inoculation even if the manifestations of the first inoculation had been considerably modified but not cured.

It would seem from this report that the newer arsenicals should be used in as large a dose as possible within the bounds of safety as originally advocated by Ehrlich, not only to destroy the spirochete which is already in existence in the patient, but to put the patient in such a position of good health that if exposed to reinfection he will be less susceptible than he would be if only half cured. On the other hand there are clinicians who have reached the conclusion that frequently repeated moderate doses give the best results. Much probably depends upon the virulence of the infection.

THE EFFECTS OF BENZYL ESTERS.

Much attention has been paid during the last two years to the physiological action and therapeutic value of the benzyl esters, chiefly through the publications of Macht, who, recognizing the near relationship of these compounds to one of the group of opium alkaloids, carried out experiments which seem to prove that in these compounds valuable new remedies were represented. Still further investigation by other students of the subject has also seemed to indicate that benzyl benzoate, the preparation advocated by Macht and the one which has, of course, been most largely employed, can be used with advantage to meet the many indications. The chief of these indications has been, of course, the sedation or relaxation of unstriped muscle fiber that is in spasm or unduly irritable. As with all new drugs, benzyl benzoate has been received with enthusiasm. Many favorable reports have been made concerning its use in constipation, asthma, and even in instances of high blood-pressure. Other reports have been disappointing, and within the last few months certain investigations were reported which seem to prove that, in animals at least, the benzyl esters did not possess the activity which Macht believed to be present. Benzyl succinate has been introduced with the idea that it will be equally efficacious and far less irritating to the stomach, and some of the results which have been obtained from it would seem to indicate that it is equally active as a therapeutic agent.

Still more recently Nielsen and Higgins have seemed to prove that benzyl cinnamate is more effective in its action, so far as the intestines are concerned, than benzyl benzoate, and that like benzyl benzoate and benzyl succinate it is practically non-toxic when given by the mouth. Indeed, they state they have given as much as half an ounce to a dog weighing ten pounds without any noticeable symptoms. As a result of their researches upon these various benzyl preparations they conclude that those experiments which have been made upon animals and which seem to contradict Macht's original studies are incorrect, and therefore they support the view that these compounds can be used along the lines originally advocated by Macht.

On the other hand it is only fair to state that other investigators not only believe that the benzyl esters are not of great therapeutic value, but also express the view that if large doses are given in an effort to obtain success in a given case, these substances are not as innocuous as we have been led to believe. Thus, in the *California State Journal of Medicine* for September, 1921, Emge quotes the investigations of Mason and Pieck upon dogs, who found that antispasmodic effects could only be obtained by the use of very much larger doses proportionately than those which have been commonly employed. Indeed they found that doses which were efficient for the relaxation of spasm seemed to be competent to produce depression of the respiratory center with a marked fall in the blood-pressure and distinct weakening of the myocardium, and Emge believes that these experimental results are in accord with his clinical observation.

Emge found that full doses in human beings induce a leucopenia, and he raises the question whether this leucopenia in the presence of an infection may not be disadvantageous.

In this connection an interesting point arises as to the reliability of the experiments which have been made upon animals with this substance. Macht himself fully understood that certain animals can resist larger amounts of these drugs than others; herbivorous animals tolerating them well because they have a greater ability to metabolize benzyl compounds than do carnivorous animals. It is manifest, therefore, that the results obtained by experiments upon rabbits may be quite different from those reached in experiments upon dogs.

So far as the clinical use of the benzyl esters is concerned, we confess that our own experience leads us to the belief that they are more in the nature of placebos than very

active remedial agents, but even when benzyl benzoate has been given in as large a dose as 60 or 80 minims of the 20-per-cent solution in twenty-four hours, we have failed to observe that it produced any deleterious effects.

Errors in diagnosis, and conditions which cannot be overcome by any remedy, will often lead to disappointing results when these compounds are employed, but nevertheless as far as our knowledge goes at the present time their introduction has added something of value to our therapeutic armamentarium.

SURGERY OF THE LUNG AND PLEURA.

Moynihan's enthusiasm over the possibilities of chest surgery, justified by brilliant results, has been shared by many others. Outstanding among these is Gask, who has contributed an article (*Lancet*, June 18, 1921) giving a résumé of the accepted teaching of to-day.

Gask notes, and with much satisfaction, the practical elimination of sepsis as a cause of fatality following surgical intervention in the chest, and insists that the danger incident to pneumothorax is minor. In order to do clean and efficient work inside the thorax it is absolutely necessary, just as when dealing with the abdomen, to have a good exposure; a wide opening of the pleural cavity or mediastinum therefore becomes a *sine qua non*. The question may then be asked as to whether such a wide opening either kills the patient or causes serious respiratory disturbance; the answer is that during the war many hundreds of chests were opened without fatality or serious disturbance to the patient; and, moreover, that manipulation of the thoracic viscera was made without causing serious shock.

Intratracheal insufflation, with which is combined anesthesia, has been used successfully in lung surgery; by this method a slight positive pressure can be maintained in the lung, and rapid and exaggerated movements which interfere with operative manipulation are minimized. The method has certain objections which are not, however, insuperable. These objections are: first, that the initial anesthesia, before insertion of the tracheal tube, must be deep enough to abolish all reflexes; and, second, that the introduction of the tube into the trachea requires a certain amount of practice on the part of the anesthetist. The method is a good one, has given good results, and must be seriously considered.

Another scheme, which has been evolved during the war, may be called the positive pressure face-mask method. This calls for the use of an air-tight face-mask with a rubber reservoir for the gases. It is, in fact, a slight modification of the gas and oxygen anesthesia apparatus, and by it a pressure of from 5 to 7 mm. of mercury is easily obtained, and may be raised still higher. This apparatus possesses the great advantage of being simple, cheap, portable, and easy to use.

In the present state of our knowledge it is more difficult to localize, say, an abscess in the thorax than an abscess in the abdomen. The rigid wall of the thorax prevents one feeling a swelling with the hand, and in the case of the abdomen thousands of laparotomies have helped to rectify errors of diagnosis and standardize methods of treatment. It can only be by a patient and careful investigation of cases, together with a systematic investigation of our findings, that like results can be obtained in thoracic surgery.

A real help toward the attainment of a diagnosis is the taking of a careful history —occasionally even a correct localization of the disease may be gained; attention must be paid to the history of pain, cough, difficulties of breathing, and swallowing.

A general survey of the whole patient is necessary as well as the well-known method of auscultation and percussion, to which reference need not be made. The need for examination of the sputum, quantitatively, microscopically, and bacteriologically, is too well known to require comment. Then we

have cystometry, and the use of the spirometer, bronchoscope, and esophagoscope—each of which has its own rather limited sphere of utility.

Exploratory puncture performed with an aspirating needle is often of definite service, though it must be remembered that a negative finding may sometimes be a hindrance rather than a help.

In the last few years the *x*-rays have proved to be a great help toward diagnosis and localization of disease, and they will probably become of much greater value when our interpretation of the pictures has improved. It would, however, be wrong to rely entirely on an *x*-ray finding and neglect the ordinary clinical methods of examination.

Exploratory thoracotomy is the right thing to do when all other methods have failed to yield a diagnosis and when it is considered imperative that one should be made. It is by a judicious use of exploratory thoracotomy that the surgery of the chest will be advanced.

The technical difficulties of opening the chest, though greater than those of opening the abdomen, are by no means insuperable. Access to the pleural cavity is usually made from behind or from the side; the medial longitudinal opening, which is the common operation of preference in case of the abdomen, is reserved for investigations of the mediastinum.

The actual opening of the pleural cavity may be made in many ways. One or more ribs may be removed—usually subperiosteally—and at the end of the operation the edges of the parietal pleura are sewn together if possible, and then the muscles are drawn together over the defect of the rib. Or an osteoplastic flap is made, lifted up, and at the close of the operation replaced *in situ*.

Personally, the author has been in the habit of excising four inches of rib subperiosteally, and then inserting a rib spreader; by this incision a good view of the interior of the chest can be obtained and a hand can easily be inserted into the pleural cavity. The author was led to adopt this plan when operating on soldiers with wounds of the lung, when pieces of splintered rib commonly required removing. An incision through an intercostal space is simpler, gives as good a view, is easier to close, and causes less subsequent deformity.

If the exploration has to be done in the upper part of the chest, intercostal retraction may not be sufficient on account of the small amount of spring of the upper ribs. In such a case extra room may be gained by dividing the rib above and below the incision at its costal junction.

After an opening by means of an intercostal incision, the chest can be closed without difficulty by suture either passed round or through the ribs immediately above and below the incision. The former, or pericostal stitch, has the merit of being quicker; a curved needle is passed through the whole thickness of the intercostal space at the upper edge of the upper rib; it is then passed under the lower rib and out through the lower intercostal space, just sufficiently removed from the inferior edge to miss the intercostal artery. If the transcostal stitch is used, holes are punched through the ribs above and below the incision, sutures threaded through, and then drawn tight.

If the region of the chest to be explored lies in the upper and inner portion of the chest or in the mediastinum, the easiest means of access may be through the sternum.

One way is to make an oblique incision through the sternum from the second intercostal space into the notch at the top of the manubrium. A curved incision is made, starting in the middle line half an inch above the manubrium sterni, and continued in a curved direction to the third rib, one inch external to the edge of the sternum. The attachment of the intercostal muscles to the sternum in the second intercostal space is then severed and a director passed from the second space to the manubrial notch, keeping immediately under the bone; a special pair of sternum shears is then passed along the track of the director and the bone split. The two surfaces of the sternum are then clawed apart with retrac-

tors, and good visible access is gained to the upper part of the mediastinum and the pleural space.

A second method is to split the sternum down the middle and turn up a flap consisting of sternum and the attached ribs. Two small trephine holes may be made with a Hudson trephine, one opposite the second and the other opposite the sixth or seventh interspace; the sternum is then split medially between the two holes by the sternum shears; next, two cuts are made outward, one from each trephine hole, through the sternum into an intercostal space, and a flap consisting of sternum and attached ribs lifted up. The internal mammary vessels are then brought into view, ligatured, and divided. The costal-sternal flap can then be lifted up and an excellent view of the mediastinum obtained. At the end of the operation the flap can be replaced, sutured in position, and the chest completely closed.

The question is often asked whether it is possible to remove an entire lobe of a lung for such a disease as bronchiectasis or carcinoma. It is not at all difficult to remove a portion of the periphery of the lung; it has often been done for the removal of an injured portion of the lung during the war. Removal of the entire lobe presents certain difficulties; but it has been done successfully, and may be done again if really required. The difficulty lies in the permanent closure of the bronchus. The method suggested by Willy Meyer recommends itself, namely, an adaptation of the usual way of securing and invaginating the stump of the appendix after appendicectomy.

The treatment of an ordinary straightforward case of empyema has not changed markedly for hundreds of years. In olden times it was opened by a cut with a razor through on intercostal space or by burning a hole with a red-hot iron. The latter method was preferred by some surgeons as being "less dolorous."

At the present time the usual treatment is to open the chest and drain the pleural cavity by means of a rubber tube, either through an intercostal incision or by excising an inch or so of rib. As the discharge lessens the tube is shortened, and if all goes well, as it often does, the partially collapsed or compressed lung expands, becomes adherent to the parietal layer of the pleura, and the patient is cured after a few weeks, though the chest may show some permanent flattening on the affected side. But all cases do not run such a favorable course; in many patients the external wound tends to close before the pleural cavity has become obliterated, and has to be reopened perhaps two or three times in order to evacuate a collection of pus. In such cases a permanent cure may still be obtained, at the expense of a more or less collapsed lung and a greatly thickened pleura. In other patients—luckily a minority—there is a persistent sinus, which if untreated lasts for years and is a source of grave danger.

It is universally recognized that a collection of pus in the pleural cavity is a dangerous condition, and it behooves us to consider whether the classical treatment can be improved on.

The first improvement to be noted is that which has followed making an airtight closure around the drainage-tube which is inserted into the chest, and leading a tube from this to a vessel partly filled with water under the bed, so that pus may drain out and air may not be sucked back; by this device the lung is encouraged to expand more quickly, so as to obliterate the pleural space. It is not necessary to dilate on the many devices which have been invented to accomplish this end.

Another procedure which is still very much in the experimental stage, and therefore *sub judice,* is that of evacuating the pus in the pleural cavity by open operation followed by immediate complete closure. During the last war medical officers had many cases of hemothorax to treat. A certain proportion of these became infected and developed empyema, being usually opened and drained in the classical way. It was found, however, that if the infection was diagnosed at a very early stage the

chest could be opened, the blood-clot cleared out, and the chest closed without having to be drained. It is true that the number of patients treated in this way was small, and that there were many failures requiring subsequent drainage. It is also true that once infection had been established for several days the method appeared to be useless; moreover, success depended greatly on the amount of infection and the nature of the infecting organism, for in the presence of streptococci failure was the rule.

There seem to be only two accepted methods of treating a chronic empyema sinus. One is to remove a sufficient quantity of the bony thorax, so as to allow the parietes to fall in and obliterate the cavity; this is done by means of the well-known operation of Estlander.

There is yet another device for curing a persistent empyema sinus which has been used by Beck, of Chicago. He has skin-grafted the interior of the tissues and has shown patients cured in this manner. The method is not likely to be widely used; it is difficult to carry out, and the patient is left with a deep hole in the side, covered by skin, but difficult to keep clean and non-odorous.

What is the position of surgery at the present time toward tuberculosis of the lung? About 1800 a certain number of surgeons conceived the idea that portions, or indeed the whole, of the lung might be removed. Animal experiments were performed which proved that portions could be removed with safety, the remaining lung expanding and filling the pleural cavity. On the strength of these experiments a certain number of operations were undertaken for the removal of portions of lung affected by tuberculosis.

With regard to these operations it may be said that they are never likely to have a wide application; not only because it is nearly certain that more than one part or more than one lung is affected, but also because in the early stage (in which alone surgical measures would be justifiable) there is a good chance of securing a cure by medical methods. There is a very general feeling, too, among surgeons that surgical treatment of tuberculosis should become less and less as our knowledge of preventive and curative medicine increases. As an example of this statement, one may turn to the treatment of tuberculous glands of the neck. Ten or fifteen years ago the removal of tuberculous glands in the neck was one of the common performances in hospitals; now it is rare, for the glands are cured in other ways.

Of collapse of the lung by nitrogen no mention need be made here, for it is fully dealt with in medical books. When nitrogen replacement fails owing to adhesions preventing collapse of the lung, it may become necessary to remove a certain amount of the bony thorax to allow the chest wall to fall in.

NEUROLOGICAL SURGERY.

Although we dealt with this topic in the editorial pages of the September issue of the THERAPEUTIC GAZETTE its importance justifies its further consideration in this issue.

Cushing (*Ohio State Medical Journal*, June, 1921), continuing his review of neurological surgery, states that it is true of all intracranial operations that in the knowledge of ways and means of controlling tension lies the secret of surgical success. Intracranial overtension is largely a matter of an increase in the fluid content of the chamber, whether it exists as free fluid in the ventricular and arachnoid spaces or as an edema, a state to which the nervous tissues are particularly prone. Though formerly the extensive withdrawal of fluid was looked on with apprehension, it has come to be an essential step in many craniocerebral operations.

Weed, by adapting the principle of injection of non-granular fluids from which granules might subsequently be precipitated, showed conclusively that the arachnoid villi represent the points of escape for fluid which, by a process of seepage, enters directly into the pachymeningeal sinuses.

Weed's continuation of these studies on his return to Baltimore and his demonstration of the manner of development of the fetal arachnoid spaces stand as the most important contribution to our knowledge of the meninges since Key and Retzius.

If it be true that most cases of congenital hydrocephalus can be accounted for by a faulty development of the villi, the rational treatment is to reproduce in some way this channel of outflow either by direct drainage into one of the larger sinuses or by encouraging the formation of new villi.

In a recent paper, which has aroused great interest, Dandy has put forth some very definite claims regarding the localizing value of what he calls ventriculography in cases of brain tumor. This, in other words, is the taking of Roentgen-ray plates of the cerebral ventricles after their fluid contents have been removed and replaced by air.

Another procedure, likewise in an experimental stage, though capable, it is hoped, of further development, is the diagnostic puncture of the cisterna magna, a procedure worked out in the Army Neurological Laboratory under Dr. Weed's direction during the war, and which has subsequently been warmly advocated by James B. Ayer. When one realizes how loath the profession was to adopt Quincke's lumbar puncture as a more or less routine measure, one hesitates to say that a suboccipital puncture will not some day come to be as commonly employed.

Probably the most suggestive papers issued by this laboratory during its short life were those by Weed and McKibben on the experimental alteration of brain volume following the intravenous injection of various substances in solution. They observed that, after the cortex was exposed by a trephine opening, the intravenous injection of a watery solution caused the brain to protrude through the opening, and contrariwise, that hypertonic salt solution caused it to recede, sometimes to a very extraordinary degree.

They found, in the first place, that it would answer almost as well to give sodium chloride by mouth, and it is at times quite amazing to see what an immediate symptomatic effect, particularly when there is increased intracranial tension, this simple procedure may have.

That it is not entirely free from risk we have reason to know. Great hopes were aroused, particularly from a prophylactic standpoint, by Crowe's discovery of the passage of hexamethylenamine through the choroid plexuses and its prompt appearance, after administration by mouth, in the cerebrospinal fluid. We did not know at the time that it appeared unchanged, and that only in an acid medium like the urine was it broken up with the liberation of formaldehyde. Crowe's observations, however, on the efficacy of the drug, particularly as a prophylactic, in experimental canine meningitis were nevertheless so convincing that we have continued with its use in certain conditions—in patients with basal fracture, before transsphenoidal pituitary operations, and so on. It certainly does no harm, though we may have been leaning on a broken reed.

There is no more satisfactory operation in surgery than the removal of an accurately localized endothelioma of the spinal meninges—no operation, unless it be for some of the major trigeminal neuralgias, in which the transformation from a suffering and bed-fast invalid to a normal life is more like resurrection. It does not do merely to tilt these lesions out; the meningeal attachment from which they take origin must also be removed, and this is not altogether easy since the central point of attachment seems invariably to be at the point of emergence of a segmental nerve root.

It is astonishing how promptly it begins and how great a degree of functional recovery is possible in the flattened cords long subjected to pressure by such a tumor. What is more, the promptness with which this restoration sets in may be taken as an evidence of the delicacy with which the tumor enucleation has been conducted.

Cushing classifies the results of traumata as hematomyelias; the total cross-lesions usually from fracture dislocation; and partial injuries; the latter being the only ones suitable for surgical intervention.

Many facts have been brought to light

regarding the localization of function in the cord, but possibly the most immediately arresting are those incident to the studies of Henry Head and his coworkers. Their observations have shown that, even when in its cross extent the lesion has been anatomically complete, the cord distal to the lesion is capable of resuming its reflex function to a degree hitherto unappreciated. This process, in the absence of infection, begins to set in after the third week, at which time the lower spinal reflexes begin to reappear. Hence the old conception of a permanent loss of deep reflexes with flaccid paralysis as an indication of a total transsection falls to the ground.

Cushing closes his study with the following observations: There is a problem relating to the care of these patients for which the war does not seem to have given a satisfactory answer, namely, the correct method of dealing with the bladder in the early stage of retention. The main desideratum, if one hopes to attain for his patient a subsequent automatic bladder control, is the avoidance of infection, and whether a constant drainage by catheter from the outset, repeated catheterization, suprapubic drainage, or the avoidance of any direct interference whatsoever and letting the bladder distend till it dribbles—which of these methods is best no one so far has been able satisfactorily to determine, nor in this generation will we again, let us hope, have so good an opportunity of finding out.

The surgery of the peripheral nerves, other than cranial, belongs largely though not entirely to the domain of traumatic surgery, and as injuries of the larger nerves are often coupled with deformities and need what is called physiotherapy, together with some supporting apparatus in their after-care, a bid for these lesions during the war was made by the orthopedists.

It was calculated that fully 25 per cent of all major injuries of the extremities were accompanied by a more or less serious involvement of important nerve trunks, and it makes little difference who cares for them—if an orthopedist, he must have a better neurologic training and operative technique than most possess; if a neurosurgeon, he must familiarize himself more than he is accustomed to with the mechanical correction of paralyses. The subject at all events received a great fillip during the war, and much has been learned and much unlearned regarding nerve sutures. Attention may be called to a few points which stand out clearly from the great number of published observations.

It has long been known that divided nerves, given half a chance, tend to reunite. Indeed, under circumstances when a purposeful section or avulsion of a nerve has been made it is well-nigh impossible at times to prevent some degree of functional reunion. This the old-time peripheral operations for facial neuralgia made only too clear. What takes place has been more or less a subject of academic dispute between the supporters of the neuron doctrine and those of Bethe's school, who believed in the possibility of a peripheral regeneration of axons. Though Bethe undoubtedly found axons in the peripheral segments, Langley's explanation of their presence was doubtless the correct one. In short, the proliferation of the cells of the neurilemma sheath is the only peripheral process, and though this prepares the way for the axon, unquestionably the axis cylinder must grow down from the proximal segment.

From the great mass of material of the past few years the curious observation was soon made that certain nerves show a much greater tendency to perfect functional reunion than others. To take a single example, the prognosis after injury and suture of the musculospiral was far better than after a corresponding injury of the median. This appeared, moreover, to have no relation to the distance between the seat of the injury and the periphery, for a high radial suture was more favorable than a low median. The explanation for this which seems best to meet the facts is that the functional recoverability bears relation to the degree of purity, whether sensory or motor, of the nerve in question. Thus the musculospiral nerve has a great preponderance of motor fibers, and consequently after suture there is less chance of motor axons finding their way down sensory pathways

and the reverse than if the number of sensory and motor fibers were more nearly equal, as is true of the median.

One thing has been made clear beyond question, and that is the supreme desirability of bringing the two ends of the severed nerve together without the interposition of a bridge, and ingenious ways and means of accomplishing this have been devised, not only by stretching and by mobilization of the nerves, but by shortening the gap in case of great loss of substance by retaining the limb in a position of acute flexion until union has taken place.

It will be a bad thing for neurologic surgery when it becomes fashionable. Gynecology has already suffered from this, and orthopedics is in the way to follow. Tendencies in this direction are apparent. Glad as Cushing is to feel that the importance of the subject as a special line of work is becoming recognized, and confident as he feels that the day will come when professors of neurology in our schools will have had a surgical training, just as the present-day gynecologist and orthopedist must have, nevertheless the way to bring about this desired end is not through the surgical operating-room alone, but by the slow process of the neurologic clinic and the laboratory. Let us hope that some day in a national institute the all-around training which is essential may be properly acquired by medical graduates desiring to enter this field.

But for its own good, Cushing prays that neurologic surgery may never get so far from the home of general medicine and its immediate parent, surgery, that there will be an estrangement, or any possibility of its being shut out-of-doors when the time comes for its return.

Progress in Therapeutics

Medical Therapeutics

The Eradication of Diphtheria by Means of Toxin-antitoxin Following Schick Testing.

In the *Pennsylvania Medical Journal* for April, 1921, BAUER states that heretofore in the Philanthropic Health Department they have used diphtheria antitoxin to immunize all that were exposed to diphtheria; in some cases with a frequency that made it uncomfortable and possibly dangerous. Realizing the temporary nature of this passive immunity, a better method was devised and found practical—the active immunization of susceptibles with toxin-antitoxin. The immunity thus obtained is slow in its development, but its benefits are long standing. True, Schick testing and active immunization should not be deferred in their use until an epidemic or direct exposure to diphtheria has taken place because of the length of time necessary to make the reading in the test, which is best interpreted at seventy-two hours, and the development of the immunity, for which about twelve weeks is required. Nor can the toxin-antitoxin and diphtheria antitoxin be used at the same time, because both immunities, active and passive, cannot be developed simultaneously. The proper procedure then is to test all children without awaiting exposure and to immunize susceptibles actively.

Will the passive immunity of early infancy as transmitted by the mother to the child—provided that she has an immunity of her own that she can transmit—interfere either with the test or active immunization? These children so immunized always give a negative Schick reaction, but their tests become positive when they lose this trans-

ferred immunity, usually at the end of six months, but frequently enough if it lasts up to two and in a few cases even up to three years. He believes that toxin-antitoxin has protected some of these past this age, but his work has been limited to one hundred cases, all of which have not as yet passed out of the period of infancy. Since no ill effects attend the administration of toxin-antitoxin in these infants, he is inclined to continue its use, and if necessary, following Schick testing, repeat it after the third year. As yet he has no infant that has required reimmunization because of a positive Schick test. One drawback to this procedure is the fact that three doses, 1 Cc. each, must be given at weekly intervals to insure favorable results.

In more than twelve hundred cases given toxin-antitoxin, including all ages, he noted several facts of considerable interest. Since his work extends over a period of but one year, it will be impossible to give any idea of the permanancy of active immunization. Suffice it that in institutions where diphtheria was previously constant and this combined procedure employed, diphtheria does not now occur. He has noted that young children give no constitutional reaction to toxin-antitoxin. The older the individual the more apt is a reaction to occur. This is due to the bacillus proteins contained in the mixture, and the reaction is more likely to occur in a person who has a pseudo as well as a positive reaction to the Schick test. At least 34 per cent of adults will give these pseudo-reactions.

Children that react to toxin-antitoxin do so only after the first dose, as a general rule, and reactions to subsequent doses are milder, if they occur at all. The statistics compiled as a result of the work at Girard College, Philadelphia, are significant. Five hundred and forty-four of a total of sixteen hundred boys received toxin-antitoxin. One hundred and nineteen gave a reaction after the first dose; of these, nineteen reacted after the second dose, but more mildly, and after the third dose nine of the nineteen gave even milder reactions. None who did not give reactions to the first dose gave any reactions to subsequent ones. These boys ranged from six to sixteen years of age, and as Dr. F. L. Greenwalt, physician in charge of the college, expressed it, "None of the reactions were as severe as many that one sees following vaccination against smallpox." Bauer's observations on these and other reactions in children lead him to consider this statement a conservative conclusion judiciously arrived at by a cautious observer.

Some Uses of Modern Radiotherapy.

In the *California State Journal of Medicine* for April, 1921, RODENBAUGH states that the treatment of tuberculous adenitis by radiotherapy is an established procedure. Cures are produced in over 90 per cent of the cases, and the end results are superior to those of other methods. This method leaves no deformity, and during treatment the patient's general condition is greatly improved. In most cases, after radiotherapy, the nodules disappear entirely. In a small percentage of cases they remain small and hard, the result of fibrous changes. Surgery is rarely indicated in tuberculous adenitis, but care should be taken that other foci of infection, such as teeth, tonsils, and adenoids, are removed to secure the desired result.

The use of radiotherapy in Hodgkin's disease, the leukemias, and lymphosarcoma is well established and offers the best known method of treatment for these conditions in the light of our present knowledge.

The treatment of incipient cataract offers the most striking results of any method yet used to check and absorb the progress of lenticular opacities. In over 80 per cent of cases there has been a marked improvement. Excellent results have also been obtained in vernal catarrh and trachoma.

In hyperthyroidism the efficacy of radiotherapy is well established, but there is still a wide divergence of opinion as to the end results of both surgery and radiotherapy.

This divergence of opinion is probably due to the difficulty and frequent inaccuracy of diagnosis. The use of basal meta-

bolism estimation seems to have placed the diagnosis of hyperthyroidism on a fairly sound basis, and is particularly valuable when used to control treatment. Naturally, colloid, cystic, and nodular goitres, and those causing marked pressure symptoms, are not amenable to radiotherapy.

In a well-controlled group of cases the work of Means and Aub and others, comparing the end results of radiotherapy, surgery, and medicinal treatment of exophthalmic goitre, can be taken as fairly indicative of the proper method of treatment in such cases. They conclude that the safest programme for the treatment of exophthalmic goitre as a whole is routine radiation of thyroid and thymus with surgery held in reserve for cases that do not respond.

The use of radiotherapy in goitre does not subject the patient to primary surgical mortality, there is a shorter rest period necessary, and the end results are usually better. These cases, then, should logically be given the benefit of this benign method of treatment before instituting any more radical form of therapy.

Vaccination Against Influenza and Some Other Respiratory Infections.

In the *Journal of Infectious Diseases* for April, 1921, JORDAN and SHARP state that the prophylactic effect of a widely used vaccine containing Pfeiffer bacilli, streptococci and pneumococci has been studied clinically and statistically. They have recorded during a period of about seven months the respiratory ailments which developed among 6066 persons, approximately half of whom had received the vaccine. Some of these were attacked by influenza in the 1920 wave, which occurred within two months of the vaccination; in addition, the usual number of pneumonia and common cold cases among those observed afford material for comparisons.

Rhinitis and bronchitis developed with frequency about equal in vaccinated and unvaccinated groups.

The influenza attacks among the 2873 vaccinated numbered 118 (4.1 per cent) and among the 3193 unvaccinated numbered 152 (4.8 per cent); 7 pneumonia complications with 2 deaths occurred among the 118 vaccinated patients, and 12 with 2 deaths in the 152 unvaccinated. Both the influenza and pneumonia attack rates are hence somewhat lower among the vaccinated, but the difference is not great. Pneumonia, not associated with influenza, was also less frequent among the vaccinated, only six of 19 pneumonia patients having been vaccinated. The small numbers hardly warrant, although they suggest, a favorable conclusion regarding some slightly prophylactic value for pneumonia. That any considerable degree of protection against influenza was conferred by the vaccine seems unlikely.

Indications for Infusion of Blood Substitutes and Transfusion of Blood in Cases of Traumatic Hemorrhage and Shock.

In the *California State Journal of Medicine* for April, 1921, BUTLER states that any case of shock that continues to register a systolic blood-pressure of seventy to eighty millimeters of mercury after the usual treatment for the relief of shock, such as external heat, relief of pain, and an infusion of seven-per-cent acacia or six-per-cent glucose solution, should be transfused with from 600 to 1000 Cc. of blood from a tested donor. Transfusion should be resorted to regardless of whether the circulating blood has been changed by hemorrhage or exemia.

If following the application of external heat, relief of pain, and infusion of acacia or glucose solution the blood-pressure takes a decline and drops lower than the previous low mark, and does not rise again following another infusion of acacia solution, transfusion with a compatible blood is demanded.

A hemoglobin of twenty-five per cent or less always calls for transfusion.

If a patient is exsanguinated, transfusion of blood from some healthy indi-

vidual, without waiting for the ordinary tests, is indicated. Infusion of acacia solution, or even physiological salt solution, should be given while preparing for the transfusion of blood. This transfusion, without waiting for compatibility tests, is to be resorted to only in extreme cases, where any delay whatever would be fatal.

Vitamine Content of Honey.

In the *American Journal of Physiology* for April, 1921, HAWK, SMITH, and BERGEIM state that strained honey was found, by experiments on albino rats, not to contain more than minimal amounts of the growth-promoting accessory substances, fat-soluble A and water-soluble B. Comb honey was found to contain the fat-soluble vitamine in moderate amounts. Honey did not protect guinea-pigs against the development of scurvy. The addition of honey to bread did not appreciably delay its digestion in the human stomach.

Analysis of More Than 200 Cases of Epilepsy Treated with Luminal.

In the *American Journal of Insanity* for April, 1921, KIRK states that the use of luminal in the treatment of epilepsies in the Arkansas Hospital for Nervous Diseases was instituted with considerable skepticism and only with the hope of controlling the seizures and not with the expectation of a cure of the disease. On December 8, 1919, he selected as cases to be treated a certain number of patients whose seizures were the most frequent and the most severe, some of whom had been bedridden for weeks, months, and even years. He felt that if luminal would improve the condition of these patients we would then be justified in proceeding in the treatment of milder cases. The results in certain cases were so startling and so remarkable that within thirty days all cases of idiopathic epilepsy were placed under this treatment. His method of treatment consisted of 1½ grains of luminal at bedtime. Luminal was prepared in tablet form. After about sixty days his supply of luminal was exhausted and it was necessary to use luminal-sodium. The luminal-sodium seemed to be as effective as the luminal. At no time did he notice complaint on the part of the patient of being dizzy or heavy with this dosage. Within a few days he noticed a change in the number and severity of the seizures of the patients who were under treatment. He did not increase the dosage except in five instances. In these particular cases he used 1½ grains of luminal or luminal-sodium night and morning, and in two instances he used it three times per day, but after the seizures were under control he then resumed the old method of 1½ grains at bedtime.

On May 1 his supply of luminal and luminal-sodium was exhausted, with the exception of a small quantity which had been reserved for the use of serious cases and cases of status epilepticus. Within a few days after his supply of luminal was exhausted there was a very noticeable increase in the number and severity of seizures, but this was not equal to the conditions as they existed previous to the treatment and up to the time of his report, May 26, 1920. He does not agree with one writer who claims that the seizures were more severe and more frequent than ever before.

All stimulants, tea, coffee, tobacco, were prohibited. No change in the diet was made, except a closer supervision was exercised over the diet of the patients in regard to the quantity of food eaten. We are all familiar with the tendency of the epileptic to gormandize. He learned that many of his patients were secreting food in their clothes while in the dining-room and eating it after going to their rooms. This particular feature caused him considerable trouble for a time after the treatment was begun. The bowels were kept open, as usual, with cathartics consisting very largely of Epsom and Rochelle salts. The treatment of serial seizures and of status epilepticus was carried out in the usual way—that is to say, by the use of elimination and restricted diet—but instead of

employing drugs formerly used to combat these conditions luminal was substituted; it became necessary, however, to use larger doses, as many as five grains of luminal every three hours.

There were 61 patients who had no convulsions after treatment was begun; 106 patients that had less than five convulsions while under treatment; 45 patients that had more than five convulsions. February 8, one patient died of lobar pneumonia; February 25, one patient died of mitral regurgitation; March 9, one patient died from status epilepticus.

Kirk believes that the use of luminal in the treatment of epileptic seizures is in the experimental stage, and not until several thousand cases have been treated over a period of years will we be able to determine its true value.

Summing up his experiences Kirk reaches these conclusions: There was immediate decrease in the number of seizures, a decrease in the severity of the seizures, many of them changing from grand mal to petit mal, decrease in the severity of furore and a shortening of the time of confused states, an improvement of the mental and physical health of all patients, fewer number of accidents, a general improvement of the moral tone of the wards, and a complete cessation of the seizures in a large number of cases. No deleterious effects were observed on the kidneys or stomach; circulation, temperature, and respiration were uninfluenced. Luminal is not a habit-producing drug and is not attended by any pleasurable or disagreeable sensation. In certain cases the drug is effective in twenty-four to forty-eight hours, in others not until a week or more has passed.

The purpose of Kirk's paper is to make a preliminary report on the effects of luminal on institution cases, which are obviously the most severe types of epilepsy to be seen. The reports made by neurologists are apt to cover milder types of epilepsy which are treated in private practice. The results are so gratifying that he desires to present them to the medical profession so that they may see for themselves just what can be done with the severest types of epilepsy. Luminal gives promise of being the most effective and the least harmful of all drugs that have ever been used in the treatment of epilepsy, and will be a god-send to these poor, afflicted, pitiful, hopeless defectives.

Atmospheric Conditions and Efficiency.

The *Lancet* of April 30, 1921, in an editorial on this subject states that attention was recently drawn in the same journal to an interesting report of the Industrial Fatigue Research Board based upon the use of Leonard Hill's instrument, the katathermometer, in boot factories in England. Another report emanating from South Africa indicates that this instrument is also being used in other countries. The research reported upon by Orenstein and Ireland, working in the Rand gold mines, is the first effort known to us to estimate scientificially the effect of atmospheric conditions upon output and fatigue; for although Hill has insisted upon the importance of ventilation in relation to bodily activity, he has relied principally upon the increased strain thrown upon the circulation in secreting sweat in order to dissipate heat as the indication of reduced capacity for work.

The article under review opens with an excellent summary of physical fatigue and methods of estimating it, and of the work done by Haldane on respiration and Hill on ventilation. The authors devised two forms of ergometer: one was constructed to simulate closely hand-drilling, the type of work which causes the greatest amount of fatigue in gold-mining. In this apparatus blows of a hammer are communicated to a metal disc and, through its deflection, to a column of water which actuates a piston; the movements of the piston are recorded on a revolving drum. The second ergometer was essentially a band-brake dynamometer driven like a winch. Every revolution made by the operator represented so much work done for a certain net pull on the brake pulley. The observer had only to note and take periodical readings of a

revolution counter. Two native "boys," one a finely developed Xosa, aged forty, and the other a sturdy Basuto, aged thirty-five, were employed to work these instruments first on the surface and then in various places in the underground workings; meanwhile atmospheric conditions were observed by using the kata-thermometer, wet and dry, and taking ordinary wet- and dry-bulb temperatures. Observations were also made on the "boys" as to loss of weight, and skin and mouth temperatures. Conditions underground were observed as found, and also after stirring up the air, where oppressive, by a fan introduced for the purpose.

Many difficulties were experienced, as must always be the case when experimenting under industrial conditions. After due allowance made for these, the writers consider a definite relation to be established between working efficiency and the dry, cooling power of the air. If efficiency is placed at 100, with a cooling power measured by the dry kata-thermometer of 6, it falls to only 50 when the cooling power falls to 1. The value of air movement alone was shown by use of the fan placed so as to blow a current of air over the "boys"; in one case an increase of 46 per cent of output, and in another of 32 per cent, was obtained. The relation between cooling power and output having been determined in this way, observations were made throughout a representative section of a mine. The cooling powers, estimated working efficiency, the number of men, and equivalent number at full efficiency were then ascertained, and the important conclusions arrived at that 21 per cent of output was being lost through inadequate cooling power. "This loss is loss of output and does not include the losses due to the increased morbidity which must surely follow on the excessive strain and fatigue associated with work in oppressive atmospheres; such losses would be hospital charges and cost of replacing sick men." We have here an instance of the importance to the economics of industry of studying the economics of humanity. Which costs most? The loss of 21 per cent of output with its attendant increase of morbidity, or the cost of increasing the cooling power of air in the mines?

A laboratory worker reading this report may find much to criticize from the point of view of strict scientific control of observations; he may object on principle to the value of ergometers to measure output as being under the entire control of the operators; he may point to the influence of practice effect, and stress the difficulty of controlling the doings of the subjects outside working hours. Such things, however, must always be encountered under industrial conditions, and Orenstein and Ireland are fully alive to their importance. They are to be congratulated on having carried out a difficult and important research, and on having obtained definite and practical results. It is to be hoped that this work will be carried further, and that some of the more unusual methods of measuring output rather than using ergometers may be employed for estimating efficiency when trade revives. Some of the repetition work, so frequently referred to, should lend itself to hourly and daily computation, and so provide conditions for observation.

Misuse of Vaccines, Hay-fever Pollens, and Proteids.

In the *Pennsylvania Medical Journal* for April, 1921, ERSNER states that vaccines are valuable in otolaryngology and should be administered in small doses in the early stage so as to act as stimulants.

In chronic conditions large doses should be administered so as to stimulate leucocytosis.

In acute ear, nose and throat conditions the predominant cell found in the secretions is the polymorphonuclear leucocyte, while in the chronic conditions the mononuclear lymphocyte predominates. As the lymphocyte is increasing and the polymorphonuclear leucocyte is decreasing in the secretions, large doses of vaccines should be administered so as to stimulate leucocytosis.

Ersner says: Do not administer pollens

during the acute attack of hay-fever, as the patient at that time is already saturated with toxins, and upon inoculating him with pollens he often becomes worse.

Administration of pollens should begin about three months before the attack and cease six weeks before the attack is due.

During the attack he would suggest administering bacterial vaccines in small doses so as to stimulate an immunity against rhinitis, which is concomitant with hay-fever.

In asthma it is important to determine any underlying factors, such as nasal obstruction, cardiac and renal disease, and focal infection, and not depend exclusively upon the proteid tests and desensitization.

Chaulmoogra Oil in the Treatment of Tuberculosis.

In the *Journal of Laboratory and Clinical Medicine* for May, 1921, CULPEPPER and ABLESON state that a one-per-cent solution of the acid sodium salts of all the acid fractions of chaulmoogra oil they used were found to be non-toxic. Often the guinea-pigs used showed a marked increase in weight after the administration of heavy doses. One group suggested the presence of a vitamine or some element which has a marked influence on the weight of the pigs.

The peritoneal administration in the case of guinea-pigs was found to produce no undesirable effects. In this case peritoneal administration was found to be a method by which the salts may be absorbed by the body.

They found that the acid sodium salt of chaulmoogra oil has a specific bactericidal action on tubercle bacilli. Sweeney and Walker showed it was specific for the acid-fast group in a 1:100,000 dilution. They were only able to prove its bactericidal properties for tubercle bacilli in a dilution of 1:10,000.

Of the 12 pigs inoculated with tuberculosis and not treated, all died except one; of the 12 pigs treated only one died.

A marked difference in the pathologic findings between pigs which were and were not treated was observed, the advantage being in favor of the treated pigs.

Treated pigs showed an average gain of 49 grammes over the ones not treated; the time factor being kept constant.

Auricular Fibrillation and Flutter.

The *British Medical Journal* of April 23, 1921, in an editorial on this subject, states that in the Oliver-Sharpey lectures, of which there is a complete report in the same issue of the *Journal*, Dr. Thomas Lewis described an attempt to ascertain the nature of certain grave disturbances of the human heart-beat. After years of patient investigation, aided by able and painstaking assistants, he is now confident that he has at last solved the riddle of the disorderly action of auricular fibrillation and the rapid and varying ventricular rate in auricular flutter. That this is of very great practical importance is obvious in view of the fact that auricular fibrillation is the most common cause and frequently the immediate cause of cardiac failure.

Fibrillation of the auricle was first recognized as a clinical entity by Sir James Mackenzie in 1890. It was he who appreciated the specific nature of its disorderly action and how it differed from the other arrhythmias, but he was not then in a position to state the essential nature of the happenings in the auricles. At first he was inclined to the view that the auricles were simply distended and paralyzed. Later he held that the auricles and ventricles contracted simultaneously in response to an irregular stimulation originating in the auriculoventricular node; the term nodal rhythm was employed to indicate this form of arrhythmia. This view in turn had to be abandoned when, in 1910, it was demonstrated by means of the electrocardiograph that the state of the auricles in these patients was identical with a condition produced experimentally even so far back as 1887, and termed fibrillation. In Dr. Lewis's lectures we have the final explanation of this important cardiac disorder.

Normally the contraction of the auricles

is a coördinated movement, occurring regularly. The stimulus originates in the sino-auricular node or pacemaker, and initiates a response in the auricles. Dr. Lewis shows that the action of the auricles is fundamentally different when flutter and when fibrillation occurs. The normal pacemaker is side-tracked, and a peculiar "circus movement" begins. In this movement the wave of contraction travels in a circular path, and constantly passes over the same ground. In order to form a clear conception of this mode of auricular activity it is essential to remember that, following every contraction of the auricular wall, the myocardium becomes refractory. This refractory stage persists for a varying time, and when it finally passes off the fibers are sensitive and responsive. When circus movement is present a wave of contraction is continuously circulating. The crest of this wave is always chasing its own wake across a gap of responsive tissue, and so long as there is this area of responsive muscle fiber in front of the advancing wave it continues to progress. It is obvious that this gap, both in its extent and also in the degree to which it has recovered its responsiveness, is of extreme importance. As Dr. Lewis indicates, if that gap could be closed, the circulating wave would come to an abrupt termination and permit the normal pacemaker to resume control of the heart.

Auricular flutter and fibrillation are both shown to be due to the same type of abnormal contraction of the auricles—namely, circus movement. There are, however, certain important differences in the action of the auricles in these two conditions. In fibrillation the rate is about 50 per cent higher than in flutter, and the action is not regular.

The explanation of these differences is the most fascinating section of the lectures. It is shown that the higher rate in fibrillation is due to the fact that the path of the circulating wave is shorter than in flutter. In many cases of flutter the "mother wave" encircles both venæ cavæ, while in fibrillation the ring of muscle fibers around the opening of the superior vena cava alone may be involved.

The reason for the irregular action in fibrillation is to be found in the condition of the responsive gap already mentioned. With the very rapid rates of contraction in flutter and fibrillation there is a decrease in the duration and quality of the responsive phase, and a condition of partial refractoriness develops; this interferes with the progress of the advancing wave of contraction. In fibrillation this barrier becomes pronounced, and the rate of the onward movement of the wave varies, producing the disorderly rhythm of the ventricles so characteristic of fibrillation of the auricle.

Prolongation of the refractory state produces a corresponding reduction of the gap. This indicates the lines along which further investigations must take place, and we may look forward to the time when we shall be in possession of remedies which, by increasing the refractory period and closing the gap, will break the vicious circle underlying both flutter and fibrillation. The foundations for such further investigations have been well and truly laid.

The Responsibility of Intensive Treatment Methods to the Incidence of Early Neurosyphilis.

In the *American Journal of Syphilis* for April, 1921, FRASER concludes:

1. The responsibilities for the increasing incidence of early neurosyphilis rest with:

(*a*) The tendency to treat primary syphilitics *en masse*.

(*b*) The method of working to a mechanical time-table.

(*c*) The blindfolded method of working to and for a negative Wassermann.

(*d*) Failure to interpret pathological findings in the light of the clinical picture.

(*e*) Losing sight of the importance of the central nervous system as regards the patient's future.

2. Modern early treatment fails in protecting the central nervous system by rap-

idly sterilizing the general systemic system and thus depriving the intrathecal system of its antibody supply.

3. The nervous system is invaded coincident with the generalization of the organism.

4. Nervous system involvement may be symptomatic or asymptomatic. In the absence of clinical signs a normal spinal fluid may indicate the successful overcoming of the organism by the central nervous system or the failure of the nervous system to react. It may also suggest that the general systemic circulation has been successfully sterilized before the intrathecal circulation was invaded. A pathologic spinal fluid may indicate implication or protective power. In the absence of symptoms we cannot accurately interpret the finding.

5. For the security of the future of the patient the invasion of the central nervous system should be taken for granted.

6. The occurrence of neurosyphilis is influenced by: (*a*) the patient's powers of resistance; (*b*) the natural resistance of the central nervous system and its inherent capacity for producing antibody; (*c*) the stage at which treatment is inaugurated; (*d*) the type of treatment employed; (*e*) the period over which treatment is carried out; (*f*) the type of organism responsible for the original infection. In this connection the question of a life cycle of the spirocheta pallida must be considered.

7. Great importance is attached to the value of clinical opinion, clinical observation, and clinical judgment. These should be correlated with careful interpretation of pathologic findings.

8. The importance of treating each particular case on its merits and as an individual, instead of treating him as one of a series, is emphasized.

9. Treatment should aim at conserving sufficient antibody for the requirements and protection of the central nervous system instead of defeating one's object by rapid sterilization of the systemic circulation, thereby leaving the defenceless nervous system to look after itself.

10. Antibody supply should be conserved over a period of years. The value of intramine as a protection for the nervous tissues warrants its inclusion in any scheme of treatment. [The use of intramine has been vigorously condemned by other authors.—Ed.]

Syphilis of the Heart.

In the *American Journal of Syphilis* for April, 1921, Brooks states that syphilis involves the heart with great frequency both in early and in later stages of the infection.

Syphilitic lesions of the heart may involve the pericardium, the myocardium, the endocardium, and the conus arteriosus. The most frequent lesions apparently originate or progress about the terminals of the coronary system, and they are located for the greater part in the myocardium.

Any form or stage of syphilitic lesion except chancre may be found in the heart.

Cardiac involvement may appear very early in the infection, when it may terminate fatally; it may long remain quiescent and first become apparent late in the disease.

The signs and symptoms of syphilis of the heart are simply those resulting from the particular lesion present, and often develop few or no definite clinical characteristics aside from their association with a history of infection, the Wassermann reaction, and the relief of symptoms and signs under specific treatment.

Ordinary methods of cardiac treatment fail to give relief of the signs and symptoms of the disease unless combined with specific medication.

Syphilis of the heart may in most early cases be cured by specific treatment. Late cases can be much improved, entirely relieved, or perhaps cured by specific treatment.

Diagnosis rests chiefly on a history of infection, concomitant signs of it in other tissues, the positive Wassermann reaction, and notably on relief under specific treatment.

Successful treatment in any case rests on the recognition of the cause of the disease.

The Nutritive Value of Yeast in Bread.

In the *American Journal of Physiology* for May, 1921, HAWK, SMITH, and BERGEIM state that flour containing five per cent of yeast powder makes a palatable bread, much more nutritious than ordinary bread. The yeast supplements both the water-soluble B and the protein content of wheat flour. Yeast is thus a nutrient constituent of bread, and any increase in its amount up to quantities far in excess of those ordinarily used will improve the food value of the product.

Prevention of Acute Arsphenamine Reaction by Antianaphylaxis and Atropine.

In the *Journal of the American Medical Association* of May 7, 1921, BUSMAN states that the exact nature of nitritoid and gastrointestinal reactions to arsphenamine is undetermined. It seems not improbable that a variety of causes may act to produce a single syndrome, of which the acute reaction on the table and, in certain cases, the late gastrointestinal reaction may be phases of the same phenomena.

In the group of cases which he reports, repeated nitritoid crises, associated with repeated gastrointestinal reaction, persisted regardless of any controllable factor in the technique.

Repeated uncontrollable acute reactions are interpreted as personal idiosyncrasies of the patients to the drug.

The observation of Stokes on the value of atropine and of induced antianaphylaxis (Besredka technique) in the control of a persistent tendency to acute nitritoid crisis is confirmed.

It has been further found that a tendency to repeated late gastrointestinal reaction can also be controlled in a large number of cases by either method alone, or by a combination of the two methods.

Atropine is sometimes effective in doses less than 1/50 grain. It may fail entirely to affect reaction even in doses of 1/50 grain.

A combination of the use of atropine and the induction of antianaphylaxis by dividing the dose of arsphenamine is more effective than the employment of either method alone.

A combination of the two methods may make possible the continuance of arsphenamine treatment in patients in whom repeated severe reaction would otherwise force its abandonment.

The Prevention of Diphtheria.

In the *New York State Journal of Medicine* for May, 1921, PARK states that the results of combined clinical and laboratory experience in testing the blood for antitoxin in case of diphtheria and in persons in contact with diphtheria have shown that only those individuals contract diphtheria who have no antitoxin or only a minute amount in their blood and tissues. Schick, in 1913, published a description of a simple clinical test, by which this can be accurately accomplished. The reaction depends on the local irritant action of minute quantities of diphtheria toxin when injected intracutaneously. If antitoxin is absent or present only in very small amounts, insufficient for protection from diphtheria, a positive reaction will appear in from twenty-four to forty-eight hours.

A positive reaction is characterized by a circumscribed area of redness and slight skin infiltration which measures from 1 to 2 centimeters in diameter. It usually appears in from twelve to forty-eight hours, but in a small percentage of cases it is delayed for as much as three days. It persists for five to fourteen days, or even longer, and on fading shows, as a rule, superficial scaling and a persistent brownish pigmentation.

Schick noticed that, in the older children and adults, a considerable percentage showed a protein reaction which had nothing to do with the specific toxicity of the toxin. In these cases, even when the mixture was overneutralized with antitoxin, this same pseudo-reaction developed. In most cases this reaction came on more promptly, covered a larger surface, was

more of the urticarial type, had as a rule a more reddened central area and a lighter surrounding zone, and disappeared within two to four days. Pigmentation is absent or slight, and superficial scaling is very rare. In a small percentage, however, the reaction persisted for a week or ten days, and it was very difficult in many of these, and impossible in some, to decide between a true and pseudo-reaction. When there was a combined reaction it was even harder to decide how much, if any, was due to the toxin and how much to the non-toxic protein, because the development of a true reaction in no way prevented the protein reaction.

The best practice, therefore, in older children and adults is to inject the toxin in the skin of one arm, and the toxin rendered non-toxic by heat, or antitoxin, in the other arm. In this way the amount of protein reaction can be noted, and it can generally be decided whether the reaction following the toxin is a simple, true reaction, a pseudo-reaction, or a combined reaction. Even after the eye has been thoroughly trained it is still wise to use the two injections when possible. On other occasions, when only the toxin injection is made, many cases which remain in doubt are treated as true reactions.

Park thinks it is apparent to all that the technique of the Schick reaction, although very simple, must be carried out with the greatest accuracy, or the results will be entirely misleading. If the toxin has been diluted and stored in a warm place, it may readily deteriorate, and, instead of giving 0.02 of a fatal dose (M.L.D.) only one-half that amount may be injected, and no toxic reaction will occur, and the misleading idea is given that the person has been shown to be immune. If the toxin is incorrectly diluted, and a large surplus of toxin is given, slight necrosis may develop at the point of injection. On two occasions when the test was extensively employed elsewhere in New York State this accident occurred, and some hundreds of people received undiluted toxin and developed very sore arms. The neutralized or heated toxin, used for the pseudo-reaction, must also be prepared with care, and if possible should be from the same preparation of toxin.

To carry out the test it is essential to have an accurate syringe, with a sharp, but short-pointed, fine needle. Most persons prefer a needle with a length of one-quarter or one-half inch and a gauge of 26. The usual 1-Cc. Record syringe answers the purpose well. The Research Laboratory places a standard diphtheria toxin in capillary tubes in such amount that the contents of one tube added to 10 Cc. of water gives the required dilution. The dilution will keep in the ice-box with little deterioration for half a day. When bulk toxin alone is at hand, further dilutions are made in normal saline, of such strength that 0.2 Cc. contains 1/40 M. L. D. for the guinea-pig. Schick prefers a dose of 1/50 M. L. D. in 0.1 Cc. The results obtained by these two injections are similar, but the author's method allows more inaccuracy, for while it is desirable to give the dilution exactly 0.2 Cc., yet even such variations as 0.1 Cc. and 0.3 Cc. give fairly consistent results—the area of redness being smaller when 0.1 Cc. is given and larger when 0.3 Cc. is administered. There is one advantage in Schick's dilution in that it permits considerable deterioration of the toxin and still leaves it sufficiently strong to be effective. It is absolutely necessary to give it intracutaneously, so that the toxin will remain in the dense tissue and have time to exert its irritant action. The slightly raised white area, at the point of injection, is infallible evidence of the delivery intracutaneously of the diluted toxin. This amount is injected intracutaneously, on the flexor surface of the arm or forearm. The persistent pigmentation for several weeks which often results may make selection of the forearm in women slightly objectionable.

Though the intensity of the reaction varies in different individuals, a well-marked persisting redness indicates an almost complete absence of the antitoxin in the individual tested. Faint reactions lasting three to seven days point to the presence of very

small amounts of antitoxin, which are not sufficient, however, to certainly protect the individual against diphtheria, but are probably sufficient to protect from systemic intoxication. To prevent the appearance of the reaction, according to Schick, the presence in an individual of at least 1/30 unit of antitoxin per Cc. of blood is required. With the weaker dilution he employs 1/50 unit will prevent a reaction. According to V. Behring, even as little as 1/100 unit of antitoxin will protect against the disease in uncomplicated cases. In a child three years of age, weighing 35 pounds, he found that a subcutaneous injection of 10 units of antitoxin was sufficient to prevent the appearance of the Schick test when made twenty-four hours after the injection of antitoxin.

The Prevention of Puerperal Infection.

The *British Medical Journal* of May 14, 1921, in an editorial calls attention to an address on this subject in the same issue of the *Journal* by Bell, in which he brings forward strong arguments in favor of strict asepsis in the conduct of every parturition, and urges that there should be no interference with the labor if it is possible to avoid it. There is no need or justification for interference in a normal physiological labor, but as interference may become necessary at any stage of labor, should something abnormal develop, asepsis is always necessary to prevent infection. Infective organisms are almost invariably conveyed into the vagina and uterus by the attendant's hands or instruments. If sterile rubber gloves are not used, or instruments are not efficiently sterilized, the patient may be infected by the attendant directly; but even if his hands and instruments are sterile, the attendant may carry infection into the uterus from the septic and pathogenic organisms always present around the entrance of the genital passage, if the skin has not been rendered temporarily sterile. Sometimes the patient has already been examined by the nurse, without aseptic precautions, before the doctor arrives. This is dangerous and unjustifiable, and should be absolutely forbidden.

Germs may be described as autogenetic if derived from the patient's own tissues, but the infection cannot properly be called autogenetic if these germs are carried up to the placental wound by the attendant. Perineal and vulval lacerations may also be infected by the organisms of the patient's skin. This may be prevented by immediately and carefully closing all such lacerations with accurately placed sutures. Infections from lacerations usually lead to local cellulitis.

As regards the feasibility of conducting a normal labor without vaginal examination, it is a fact that if a woman has been examined during her pregnancy by the attending practitioner, he can find out everything else he wishes to know by abdominal palpation, except the progressive dilatation of the cervix and descent of the presenting part, and this information he can obtain by rectal examination, as Holland has suggested. Sterilized rubber gloves must be worn as a "point of honor" in all such examinations, and sterile overalls must be worn throughout the attendance. Too frequent use of forceps is condemned by all experts, and Bell strongly urges that "the practice of using forceps indiscriminately, without medical need, to save the mother further pain, or to appease a husband's anxiety, or to save the time of the practitioner, should cease." In this view he is fully justified.

The main question to be decided is how far the practitioner or midwife should go in the preparation of the patient to safeguard her against infection. Should every parturient woman be prepared as if for an operation which may involve vulval, vaginal, and cervical lacerations and an intrauterine wound? Theoretically, this would entirely prevent infection, if effectively carried out, by an attendant who realizes his own responsibilities as the operator, and it is found easy to carry it out in hospital practice. Though rectal organisms do not infect a parturient woman unless through the

contaminated hands of the attendant, the anal region must be regarded as a source of danger, and care should be taken to have the rectum previously emptied, as in a pelvic operation. The skin round both the anal and genital areas should be prepared precisely as if a pelvic operation were about to be performed, by a sitz bath in a weak antiseptic solution, and the application of a 2-per-cent iodine solution, or other usual antiseptic. To complete the preparation, in all cases in which interference has become necessary, Bell says "no makeshift (as regards asepsis) must satisfy the practitioner," and he therefore succinctly says, "The vulva must be shaved," and later on says: "All this ritual is absolutely necessary." There should be no difficulty in doing this shaving, under anesthesia, previous to the use of forceps or versions, and in most cases it can be done early in labor without objection being raised, and without anesthesia, previous to vaginal examinations, if these have become necessary, for it must be admitted that any interference with a labor, normal or abnormal, should be regarded as a surgical operation, as Bonney has recently insisted. The more complete the aseptic ritual is the safer will be the labor, for it is probably true that the more casual or unpremeditated the "interference," such as the passage of a catheter, the more likely is it to be associated with an imperfect asepsis.

Putting aside, however, all controversial points, let the profession concentrate on the two methods now agreed upon as the most likely to prevent puerperal infection and mortality. These methods are not in dispute and have emerged from much experience and discussion of the subject. They may briefly be stated to be: (1) There should be no vaginal examination or other interference during labor unless absolutely unavoidable; and (2) there must be as complete an aseptic preparation of the patient, of the attendants, and of the obstetric paraphernalia, at every confinement, as would be appropriate to a pelvic operation. Cannot midwives, and practitioners who attend midwifery throughout the country, be persuaded to adopt these principles of prophylaxis in their entirety, and in every confinement, and so save the 1000 lives of their countrywomen which are annually sacrificed by unguarded interference and imperfect asepsis?

Recent Advances in the Treatment of Epilepsy.

In the *Chicago Medical Recorder* for May, 1921, VAN NUYS states that of late he has used luminal and luminal sodium rather extensively at the Indiana Village for Epileptics.

His attention was first called to the use of luminal in epilepsy by Dr. Francis X. Dercum's paper in the THERAPEUTIC GAZETTE of September 15, 1919, and it has been given in the dosage and manner suggested by him except that he has not in any case used the drug in combination with bromides. Until February, 1920, he was unable to procure luminal except in very small quantity, and even now the supply is limited. At the present time about two hundred patients are receiving this treatment, some having taken the drug daily for eight months. The dosage used is one and one-half grains of luminal or two grains of luminal sodium at bedtime each night. A few patients receive this dosage every other night, and in rare instances a similar dose is given night and morning. In no case has a larger dose been given, or more than two doses in one day. He has not used luminal long enough to arrive at conclusions in regard to the benefits to be derived from its use. The following statements may be made:

Erythematous rashes with edema of the lower eyelids occurred in two cases. A few patients complained of drowsiness throughout the day. This was relieved by giving a dose only every other day.

In each case the number of seizures has been reduced, in some cases considerably.

In many cases a reduction in the frequency of seizures was noted after the first dose.

In two cases no decrease in the frequency

of seizures was noted after two weeks' treatment. Treatment was withdrawn for two weeks and begun again, when an immediate decrease in the frequency of seizures was noted.

Many patients who formerly were restless and disturbed at night, who suffered from bad dreams and awoke unrefreshed, say that now they sleep soundly and feel better in the morning.

Most of these patients are brighter and more cheerful. Many are able to work who could not work before. Those who did work are doing better work.

In some instances patients who are accustomed to periods of excitement at their seizure periods do not now so react. Other patients pass through mild periods of excitement without seizures.

In no case has there been a complete cessation of seizures as the result of the administration of luminal.

When luminal has been withdrawn seizures have recurred at once.

Glycemia and Glycosuria.

In the *Lancet* of May 21, 1921, GRAHAM, in his third Goulstonian Lecture on this subject, states that the diet which he now uses has been modified in various ways as the result of reading Allen's work and further experience in treating patients. The general routine which he now employs is as follows:

The patient is allowed his ordinary diet on the first day on which he enters the hospital, with the addition of 600 Cc. of milk and 50 grammes of bread, unless he is on the verge of coma. The amount of sugar which is passed in this portion of the day is estimated and gives a rough idea of the severity of the disease. Two days' starvation are then given, tea, coffee, meat extract, and as much water as is desired being allowed. Whether the urine is sugar-free or not, the patient is not allowed to fast more than two days at a time. On the third and fourth days the egg and vegetable diet of five eggs, 50 grammes of butter, and 300 grammes of greens is given. If the patient is still passing sugar two more fast days are given, and this is alternated, as a rule, until the urine is sugar-free or the attempt to get it sugar-free has to be abandoned. If the patient is sugar-free 50 grammes of meat are added to the midday meal for two days. On the seventh and eighth days 50 grammes of ham are added for tea and one egg is taken away. On the ninth and tenth days 50 grammes of bacon are given at breakfast and one egg is taken away. If the patient passes traces of sugar on two successive days he is put back to the bottom of the ladder and made to climb up again. If no sugar is passed 100 Cc. of milk are given on the eleventh and twelfth days—that is equal to 4 grammes of sugar. This makes the tea and coffee more palatable. If no sugar is passed 15 grammes of bread are given in two doses. On the thirteenth and fourteenth days another 15 grammes of bread are added, so that the patient gets four doses of 8 grammes of bread at four meals. It is most important to divide the carbohydrate among as many meals as possible so as to spread the effect of the dose of sugar on the level of the blood sugar as much as possible. If the patient is doing well the bread is increased to 45 grammes, which is enough to keep most patients comfortable. If the amount of aceto-acetic acid is quite small, a mere trace, the butter is then increased in two doses of 25 grammes, watching the effect on the aceto-acetic acid reaction and sugar.

This makes a diet of: carbohydrates, 41 grammes; protein, 35.5 grammes; fats, 167.5 grammes; a total calories, 1865, which for a man of 60 kilos is 31 per kilo. The protein is 0.57 per kilo. It is quite true that this represents a considerable degree of under-nutrition, but it seems to be quite enough to enable weight to be maintained and life to be enjoyed. He thinks that it is wiser not to try to test the tolerance any further at this stage, but at the end of each month, if all is well, the amount of bread can be increased by another 15 or 30 grammes if it can be tolerated. This diet is enough to live on and do light work.

If, as often happens, the patient passes sugar when he is tested with 15 or 30 grammes of bread, he is put back and kept at a lower level for a further period.

The addition of alcohol to the diet in these severe cases, as recommended by Leyton, is worth a trial, as he has found that alcohol can be given without causing the excretion of sugar. The equivalent of two ounces of absolute alcohol can be used in this way. The agar-agar and bran biscuits recommended by Allen are of great assistance to the patient, as they provide a medium for eating the butter.

The ladder diet, which has developed from the original egg and vegetable day of von Noorden, differs from Allen's diet in certain important details. The fast is not continued until the patient ceases to pass sugar, as he finds that the patient stands the alternations of egg and vegetable days and fast days better than the prolonged fast. Allen has occasionally found that elderly people are upset by the fast and may have to be fed on the third and fourth days. The routine alternation which he uses may explain why any ill-effects have not been noticed. Allen breaks the fast with increasing amounts of vegetables and tests the carbohydrate tolerance on a diet which contains very little protein and fat. Later he increases the protein to 1.5 grammes per kilo, and last of all the fat. This scheme is more elaborate than the ladder plan, but it is more complicated for ordinary people to carry out.

The question as to whether it is right to add carbohydrates first and thus test the carbohydrate tolerance, and then add protein, is a very important one and is opposed to Graham's plan. Allen's recent work on the conversion of a mild diabetes into a severe one is very important, as he found that it was much easier to lower the sugar tolerance of a dog by overfeeding with sugar than with starch, and with starch than with protein. Thus the recent work is opposed to the principle of adding carbohydrate first. The ladder plan, which was based on the old idea of avoidance of carbohydrates, appears therefore to be more scientific than Allen's plan. The danger of giving fat is twofold: (1) It may cause an increased formation of acetone bodies, and the fat intake must be kept low, especially in severe cases; (2) fat has a very high caloric value, and by increasing the fat too much it is easy to break the first principle of the treatment and overfeed the patient. It is very difficult to determine whether the results are better with one plan or the other.

It has been suggested that one reason why the period of starvation produces such good results is that the absence of food allowed the pancreas to rest its external secretion and so improved the internal secretion. Allen supports this suggestion, as he found that ligature of the pancreatic duct of a partially depancreatized dog which was excreting sugar caused the cessation or diminution of glycosuria. This evidence was very suggestive, but it has been shown by Homans that the exclusion of the pancreatic juice from the intestines rendered it difficult for the animal to digest its food properly, and it lost weight. Thus tying the pancreatic duct causes under-nutrition, and it is the under-nutrition, not the resting of the pancreas, which prevents the glycosuria.

The treatment of the patient who passes sugar as soon as food is given, in spite of repeated fasts, is very difficult. Unless all hope is abandoned of improving the condition it is better to persevere with a very small amount of vegetables, protein, and fat, adding a certain amount of alcohol. The outlook in a long-standing case of this severity is very bad, but in an early acute case the treatment should be persevered with for a considerable time, as the acute case sometimes makes a surprisingly good recovery.

The question of the effect of exercise on the diabetic is a very important one, and Allen has devoted a good deal of attention to it. It has been shown that exercise causes a diminution of glycosuria and hyperglycemia in mild and perhaps moderately severe cases. In more severe cases, however, this is not the case, and sometimes

an increase of glycosuria and hyperglycemia occurs. Allen is strongly of the opinion that exercise is of great benefit to the general health of the patient.

Graham's experience has caused him to express himself rather differently, and to draw a very sharp distinction between the treatment of the acute stage and of the convalescent stage. The practice at St. Bartholomew's for some years has been to keep the patient strictly in bed so long as the sugar tolerance was being tested. This procedure was started originally by the sister of the ward, as she realized that it was impossible to keep a watch over the patients when they were up and about in a general ward. Even when they are in bed they still occasionally acquire carbohydrate surreptitiously. Although the practice was started for this reason, it was soon realized that when the patient was on a diet of very low caloric value it was much better that he should be at rest in bed. The work of Joffe, Poulton and Ryffel on the metabolism of a man who only took 2000 calories per day, or 34 calories per kilo, showed that if the man was taking exercise his energy consumption was just as great as that of a well-fed man, but when he was lying still his basal metabolism was very much less than that of a well-fed man.

If the diabetic learns to lie still in bed he will have a much lower basal metabolism than if he is up, and therefore will be able to live in comparative comfort on a low caloric diet. Last autumn, as the result of seeing the three acute cases which he describes in Lecture II, Graham was more firmly convinced of the value of the method for another reason. If the hypothesis is correct that in an acute case serious damage has been done to the islands of Langerhans, it seems reasonable to suggest that the patient should be treated as if he had had a severe illness. Whether it is possible to influence the course of the disease in any way by keeping the patient at rest no one can yet say, but the practice is justifiable on general principles.

Therefore, if the patient is seen soon after the onset of symptoms he should be kept in bed for a considerable time. His practice now is to keep the patient in bed for four weeks after he is able to take a diet of reasonable caloric value with about 40 grammes of sugar, if that result can be attained. During these four weeks no attempt is made to increase the diet at all. If he is not able to take so high a diet he should be kept at a level at which he does not have to pass sugar for the same period. After that time has elapsed he is allowed to get up by degrees. If he remains sugar-free he should gradually take on more exercise, but should avoid hard work. This advice is easy to give, but very difficult for the laboring classes to carry out. It is important to impress on the patients who have to live on a diet of low caloric value that they must rest properly whenever they are able. When they are convalescent, exercise and fresh air is good for them, as for ordinary people, and a general improvement in health may improve the sugar tolerance.

Treatment and Management of Lobar Pneumonia.

In the *Medical Record* of June 4, 1921, HERRICK states that digitalis in moderate doses in pneumonia can certainly do no harm. He believes there is no convincing evidence that in the ordinary case it does much good. The fact that digitalis influences the electrocardiographic record in pneumonia is not evidence of benefit. When chronic myocardial weakness or auricular fibrillation exists, there is no question of its advantage. He confesses to the use of small doses of the tincture as a routine, but without being convinced of its profit. He believes heavy doses in cases with normal hearts are unwise. In ten years he wonders if we shall be hearing so much of the use of digitalis in pneumonia.

Stimulants are a slender reed. The use of caffeine is often injudicious. A cup of strong coffee contains about three grains of caffeine. Let the therapeutist himself take this allowance of the drug at intervals of three hours and know the sleepless, restless, irritable state resulting. Far too often one

sees the simultaneous administration of large amounts of caffeine as a stimulant and of morphine to overcome the wakefulness and irritation resulting from the caffeine. Such therapy is injudicious, if not vicious. Caffeine may be used best in the form of strong coffee, not too frequently, and only in cases inclined to be somnolent, never in the restless, agitated, sleepless types.

Strychnine seems of little avail. The diffusible stimulants — camphor and ether, whisky, camphor in oil, etc.—are of little use. In some work done by C. C. Lieb and the writer it was shown that these and kindred substances owed their action to strong irritation of the endings of sensory nerves and not to any direct effect on the circulation. When injected into a limb, the afferent sensory tracts of which had been severed, no change in pulse-rate or blood-pressure followed.

Pituitrin may be life-saving in cases with abdominal distention from toxic paresis of the gastrointestinal tube. It is best given in conjunction with a turpentine enema, and injected deeply into the muscles.

Little profit would seem to be expected from atropine. Possibly the reduction in secretion of the glands in the mucosa of the respiratory tract has a slight value in cases with too much bronchial exudate. It certainly cannot influence the transudate, which is the outstanding fact in pulmonary edema, for which it is so often used. The use of sufficient atropine to paralyze the vagus endings is surely dangerous. Simultaneous employment of digitalis, a drug that increases the activity of the vagus, and of atropine, a drug paralyzing vagus terminations, is a therapeutic contradiction which, like the concomitant use of caffeine and morphine, needs only to be mentioned.

In cases of very low blood-pressure and impending collapse of the vasomotor system, adrenalin, given in small doses of three to five minims at frequent intervals, may benefit. The administration of adrenalin in oil, according to the method of Dr. H. R. Miller of New York, by which slow absorption is assured, is promising. Whenever there is a tendency toward edema of the lungs, adrenalin seems to be contraindicated.

The Action of Digitalis and Atropine on the Peripheral Blood-pressure.

In the *Lancet* of May 21, 1921, HARRIS, in concluding his article on this subject, states that under the influence of digitalis the diastolic pressure becomes lower and incidentally the systolic, whilst pulse pressure rises. The decline of the diastolic pressure is not due to a diminished output of the heart—the contrary is the case. The low diastolic pressure is not due to dilatation of the arteries. The conclusion is that the blood stream leaves the arterial circulation at a greater rate than under normal conditions. The corollary to this conclusion is that under digitalis the heart contains at the beginning of the systole a greater amount of blood than before. The quickening of the pulse observed in the later stages of digitalis is due to the fact that in a shorter time than normal the intracardiac pressure is sufficiently high to excite contraction.

The Effect of Tobacco on Man.

In the *New York Medical Journal* of June 1, 1921, GIES, KAHN and LIMERICK state it is significant that no constant relation exists between the amount of pleasure derivable from a given specimen of tobacco and its nicotine content or the extent of any consequent physiological effect. The preference of the tobacco smoker does not persist in the direction of tobacco containing the greatest amount of nicotine. Statistics prove that the common drift of tobacco smokers is toward the mildest form of tobacco—from the cigar to the cigarette. This voluntary drift toward the less potent is the exact reverse of what is characteristic of drug addicts. It can thus be seen that tobacco, whether mild or strong, does aid in the adjustment of the ego to its environment, and it is obvious that it does so through its action on the psychic and adrenal mechanisms.

Tobacco does not cause disease of either mind or body. It has been asserted by some that the immoderate use of the plant bears a causal relation to arteriosclerosis, but no one has yet presented proof that it does; the theory on which the assertion rests is implausible. The condition commonly termed smoker's heart is often due to myocarditis associated with gonorrhea, syphilis, rheumatism, tonsillitis, pyorrhea alveolaris, dental abscesses, and other causes.

It may be urged that since it is certain that the excessive use of tobacco does occasionally affect the vascular system and neuromuscular coördination, the plant must necessarily be an economic menace. The answer to this possible contention is quite simple: a thing is an economic asset or liability, according to the sum of its effect on the race. It is conceded that education is by far the greatest of all economic assets. Education has been acquired at the expense of some visual impairment: the eye strain incident to reading the printed word has made it necessary for many to resort to glasses in order to correct the optical ill adjustment. Again, ill adjustment to the erect posture makes it necessary for many persons to wear a truss. The right-minded do not advocate closing the schools nor do they oppose the manufacture of trusses. Others may contend that the attractiveness of tobacco for the female sex constitutes a menace to future generations.

Tobacco has no special attractiveness for the female of the species. The specific antidotal mechanism of the body to tobacco will continue greatest on the male side in conformity with hereditary forces. It is the males of all the races of the earth that exhibit the greatest fondness for tobacco. The same impulse that caused some women of yesterday to wear the deforming corset and others of today to expose their legs to wintry winds will prompt a few to affect a fondness for tobacco until another and more fetching stratagem of sex attraction has been thought of.

The habitually moderate use of tobacco is not harmful to adults.

The moderate use of tobacco proves distinctly helpful to certain adult types.

The habitually excessive use of tobacco may prove harmful to certain individuals. But the same holds equally true of all foods.

The excessive use of tobacco may prove harmful in certain neurovascular disorders.

The habitual use of tobacco by juveniles is harmful.

Diabetic Acidosis.

In the *Medical Record* of June 4, 1921, EDGAR states that if the patient is not in coma and is able to take food by mouth he immediately introduces into the stomach one gramme of carbohydrate per kilogramme of body weight in the form of orange juice or oatmeal gruel. This is best divided into four doses, and administered during the twenty-four hours. In these cases the introduction of fluid is essential. His method is to see that the patient takes by mouth at least three thousand cubic centimeters of either warm water, tea, or coffee in the twenty-four hours. A high colonic irrigation is given, consisting of one drachm of sodium bicarbonate to the quart of water. This is repeated daily till symptoms of acid poisoning have been conquered. No other food should be allowed during this treatment. If the patient presents evidence of great fatigue, poor, thready pulse, alcohol should be administered well diluted, an adult taking as much as four ounces during the course of the day.

In those patients who are in a semicomatose condition, nauseated and dyspneic, he immediately introduces high up into the colon six ounces of the following: glucose 5 per cent, sodium bicarbonate 2 per cent, dissolved in six ounces of saline solution. If the patient is a large individual he increases this to eight ounces. This to be retained. If conditions are such that active stimulation is necessary one ounce of whisky may be added.

To maintain arterial tension 500 to 1000 Cc. of sterile physiological saline solution is introduced into the median basilic vein—the quantity necessary depending, of course, on

the age and size of the patient. In the severe type, in which very heroic measures must be adopted, he infuses with a 2-per-cent glucose solution to which nine-tenths-per cent sodium bicarbonate is added. This procedure is repeated the next day if necessary.

In patients suffering from an accumulation of betaoxybutyric acid, fluid depletion of body is evident, accompanied with great loss of weight. Incidentally it may be stated that the body alkali reserve is exhausted or nearly so: which is the natural course of events in that the body has been called upon to neutralize the acid formed. Thus the indication is apparent to renew or introduce sufficient quantity of a base to bring back or renew preacidic alkalinity.

Many followers of the starvation theory do not believe that sodium bicarbonate is capable of influencing the acid condition. Edgar feels that their opinions have been too hurriedly arrived at, as a result of the administration of either too large a quantity or not enough.

Asthma.

In the *Lancet* of May 28, 1921, HURST states that he has found that the irritability of the bronchial center can be to some extent reduced by giving between 3 and 5 grains of caffeine, with double the dose of antipyrin, when the patient feels slightly asthmatic and fears that an attack will develop later, as, for instance, immediately after lunch and dinner or on going to bed.

When asthmatic attacks are caused by food proteins all that is generally necessary is to exclude from the diet the food to which the patient is found to be most sensitive by the cutaneous test. Long abstention probably results in desensitization. If eczema or urticaria is present it often disappears at the same time. Desensitization does not follow injection of the proteins or feeding in slowly increased quantities of the food. Desensitization to pollen can almost invariably be brought about by the subcutaneous injection of progressively larger doses of the pollen extract during the weeks preceding each hay-fever and hay-asthma season.

A patient can often free himself from asthma by simply avoiding any animal to which he has been shown to be sensitive, or in the case of feathers by avoiding feather pillows, mattresses, and upholstery. When an asthmatic is sensitive to horse dandruff in a dilution of 1 in 10,000 or more desensitization is necessary, as the dust of city streets contains sufficient of the protein to cause attacks. In such cases, and whenever avoidance of the animals is impossible or does not relieve the asthma, desensitization should be undertaken with the specific proteins. Nothing but specific treatment is of any use; thus an individual who is sensitive to horse serum can be desensitized with the serum if it is necessary to give him some antitoxin, but this has no effect on his asthma, even if he happens to be also sensitive to horse-dandruff proteins. A large proportion of cases are relieved; at the same time the skin reaction disappears or is greatly reduced in intensity.

Idiopathy to bacterial toxins can generally be overcome by vaccination in the ordinary way with organisms isolated from the patient's bronchial secretion or material obtained from other infective foci. In determining which organisms are most important the cutaneous reactions give some help, but even if no reaction is obtained an autogenous vaccine may prove very useful in curing chronic bronchitis or rhinitis which has acted as a reflex cause of asthma. The reaction is generally negligible if the injection is made at night and the patient takes 10 or 15 grains of aspirin at the same time. Lastly, the daily life of each patient should be investigated in every detail in an attempt to find some special toxic idiopathy other than the familiar ones already described, which may be in part responsible for the asthma.

Bronchitis should be treated by autogenous vaccines and small doses of iodides taken for long periods. A careful examination of the nose should be made and any obvious source of irritation removed, but no operation should be performed unless it

is very clearly indicated, as Hurst has seen several cases aggravated by such operations, and one of the worst cases he has ever seen was a man of fifty who had his first attack of asthma immediately after a hypertrophied turbinal had been removed. He has seen several cases in which mere cauterization of a sensitive point on the septum in an apparently normal nose, as advocated by Francis, has produced marked improvement, though rarely, if ever, complete disappearance of all attacks. In many cases an autogenous vaccine prepared from the nasal secretion will do away with the need for local treatment by relieving the congestion which is secondary to infection, and in any case it is a useful preliminary measure in order to diminish the severe reaction which occasionally follows an operation. Apart from the Friedlander bacillus, Dr. Eyre finds that the B. septus isolated from the nasal secretion, and pneumococci, M. catarrhalis and streptococci from the nasal and bronchial secretion, are the organisms most frequently found in the rhinitis and bronchitis associated with asthma.

The intestinal-bronchial reflex comes almost entirely from the pelvic colon and rectum, and regular habits and exercises to overcome difficult defecation are generally sufficient to keep it in check. Aperients should be avoided as far as possible, but in some cases a small weekly dose of infusion of senna is needed to prevent a fecal accumulation from forming.

An attack of asthma can most readily be cut short by the subcutaneous injection of adrenalin. The most efficacious dose is very much smaller than that generally given. In many cases a single minim of 1-in-1000 adrenalin chloride is enough, more than two minims being rarely required. But the injection should be given at the beginning of an attack, directly a patient wakes in the night, for instance, and not half an hour or an hour later when it has reached its full development. The relief is so immediate that the patient often falls asleep within five minutes of waking in an attack. Such small doses give rise to no unpleasant sensations, such as frequently follow the injection of three or more minims, and the blood-pressure does not rise at all. Consequently the treatment can be continued for long periods without any fear of ultimately causing arteriosclerosis. It is the only form of injection which a patient should be allowed to use on himself; if he has to depend on some one else giving the injection he will rarely receive it at the right moment.

For slight attacks and for the feeling of slight dyspnea which may persist throughout the day when severe attacks occur at night, atropine and cocaine may be used with an atomizer.

No patient should be allowed to use any of the numerous powders employed by inhaling the fumes produced when they are burnt, as they invariably aggravate any bronchitis which may be present, and actually give rise to bronchitis in patients who have hitherto been free from it. Hurst has seen several patients who have only recovered from a prolonged attack of asthma, persisting for weeks or months, after they had been persuaded to spend their nights sleeping in an easy chair instead of lying down in bed. Lastly, he emphasizes the fact that these remarks on the treatment of the attack should not make us forget that our chief aim must be to devise such a course of action for the patient that he will eventually have no attacks to treat.

Chronic Nephritis.

In the *American Journal of the Medical Sciences* of June, 1921, RINGER states that he has seen patients fed on lithia tablets, nephritic pills, diuretics, alkali and what not. We should realize what these patients need at this stage. The circulation is good, the kidney function is good—why disturb them? Why give them alkali to excrete and thus throw extra burdens on the kidneys? Why give them diuretics and drive an already tired organ? The more the patient is let alone the better.

We are not dealing with people who are sick but with people who suffer a physical handicap. Our chief duty now lies in preventing the patient from doing things which

might hasten a breakdown. If he develops slight edema of the ankles, or if the blood-pressure runs up too high, it may be advisable to place him in bed for a week or two. It is remarkable what a tremendous effect this has on the patient. Ringer has seen cases with blood-pressure of 220 and 240 come down to 160 and 180 after spending only one week in bed. The use of nitrites in these cases is of absolutely no use, except if the patient has anginal attacks. In that case he gives him 1 grain of sodium nitrite or 1-50th grain of nitroglycerin. The use of benzyl-benzoate, recently advised by Macht, Ringer says, is of no use whatsoever.

Before prescribing a drug to a patient with nephritis it is advisable to know what one wants to accomplish, what symptom or group of symptoms one wishes to eliminate, and to watch for the effect. If we do get a response, stop the drug as soon as the results sought for are accomplished. If we do not get any improvement, continuing the drug will not help but may introduce serious complications. Ringer recalls two cases, one in private practice and one in the hospital that he was called in to see. Both patients had high blood-pressure, with albuminuria and casts. The history of both was that for the past few days they had been getting more and more stuporous, until finally they could hardly be aroused. The diagnosis of uremia was made in both cases. From both the examination and the general history one could hardly come to any other conclusion. On examining the blood he found its chemical composition normal, save for a slight increase in the uric acid; but as patients with uremia never have normal urea nitrogen, the diagnosis of uremia had to be abandoned. It was then brought to light that both patients had been taking chloral hydrate for several weeks. He felt convinced that the chloral hydrate was responsible for the complications. Several days' abstinence from the drug cleared up both cases. Both patients are alive today.

We must ever be mindful of the fact that most drugs have to be excreted from the body and that it is done very largely by the kidneys. Therefore, it is important when drugs have to be used to select only those that cannot possibly aggravate matters and introduce complications.

There are a great many patients who believe that the "albuminuria" or the "high blood-pressure" constitutes their illness, and they expect the physician to "cure" them of it. A fifteen minutes' talk, in which the whole matter is explained to the patient and brought within his mental grasp, will save a lot of trouble in the end.

Success in the treatment of such a condition depends not upon drugs or medicine but upon teaching the patient to recognize his limitations, to save himself every bit of unnecessary exertion, to readjust his activities, to regulate and moderate his diet, to spend as much of his time at rest as possible. In other words, to teach the patient to live within his physiological means.

Patients who are classified as belonging to Group C, in which the patient has fairly severe subjective symptoms and the objective findings of nephritis are quite marked, are mostly ambulatory, still engaged in gainful occupations, but who begin to find it a great burden to get through the day's work. They suffer primarily from symptoms affecting the cardiovascular and nervous systems. As far as the kidney function is concerned, there is still perfect elimination of all the known products of metabolism, though in the later stages there may begin evidences of delayed excretion.

The treatment is entirely symptomatic. Headaches, dizziness, palpitation of the heart and shortness of breath form the chief complaints of most of the patients in this stage. Seldom will these symptoms be manifested in patients who have a blood-pressure of less than 220 or 240. When this does occur the patient's myocardium is usually at fault. Obesity may also frequently be responsible for it when accompanied by a not too strong myocardium.

The best and most efficient remedy, and one which seldom fails, is one or two weeks' vacation in bed, with a dose of bromide, 15 grains three times a day. During this period, Ringer restricts the diet to a low protein, low salt, and low purins—

i.e., he cuts out meat soups, tea, and coffee. In addition, he also restricts the absolute amount of food. If the headaches and dizziness are very severe the use of cinchophen tablets, in 7-grain doses, two or three times a day, is frequently of great benefit. Tolysin in 5-grain doses may also be used. The latter has the advantage of being tasteless and does not tend to produce gastric distress. Phlebotomy and withdrawal of 300 to 500 Cc. of blood is frequently followed by relief. He has had several patients who suffered such intense headaches that nothing but morphine could relieve them. The performing of a lumbar puncture and withdrawal of some of the spinal fluid plus a venesection brought them considerable relief, and they were able to get along without drugs for a long time afterward.

Staying in bed, and freedom from excitement and business worries, have positively the most soothing effect on a patient. He gets a new lease of life and feels better for months afterward.

Goitre.

In the *Boston Medical and Surgical Journal* of June 30, 1921, STANTON states that the mild cases of toxic goitre sometimes yield to long periods of rest and simple life. Those with well-established symptoms, particularly the exophthalmic cases, are proper subjects for surgery. Any mild toxic case may become toxic years and years after the onset of the disease, and it is far better to operate early than to wait until serious organic changes have taken place in the vital organs of the body, particularly in the muscular structure of the heart.

The exophthalmic cases are much more frequent in the female than in the male, and appear most frequently at about thirty years of age.

All operative cases should be given a period of rest in bed, with ice applied to the neck and freedom from all psychic disturbance. Small doses of morphia and belladonna should be taken to slow down the metabolism. Digitalis is a useful drug to lessen the action of the heart, which is so annoying at times. The slower the heart and the lower the basal metabolism, the safer the operative risk.

If the pulse is continuously under 120 and the basal metabolism is under +30, it is safe to perform a radical operation. If the pulse is continuously over 120 and the basal metabolism over +30, it is far better to do a preliminary ligation or use injections of boiling water in order to bring the patient into the zone of safety.

When one has to decide what to do in the individual case, he must use his surgical sense. The extremely toxic patient, rapidly losing weight, is a poor surgical risk. The two-stage operation has decreased the operative mortality in many other diseases, and will in the future lower the mortality of this disease.

The *x*-ray has been of doubtful value in the treatment of toxic goitre. Hydrobromide of quinine is of little, if any, value. The improvement sometimes seen during its administration may be explained by the natural improvement evident from time to time in the course of the disease. This particular one seems to progress in cycles, similar to pernicious anemia.

Stanton has found injections of boiling water, as advocated by Porter of Fort Wayne, Indiana, of great value in bringing six cases of the very toxic exophthalmic type into the zone of safety, so that he was able to do a radical operation at one sitting.

The technique is very simple: freeze or cocainize the skin over either lobe, and with a hot syringe filled with boiling water inject from 2 to 6 Cc., according to the size of the gland. This destroys a certain amount of the gland and lowers the amount of toxic material poured into the blood stream. Four to six injections usually suffice.

Primary ligation should be done in the extremely toxic cases under local anesthesia, ligating one side at a time, and including nerves, blood-vessels, and lymphatics, as advocated by Charles Mayo. From one to six months should elapse before a resection is done, depending on the rate of improvement after the primary ligation.

By a process of slow evolution in the surgical treatment of hyperthyroidism, Stanton has learned that the failure to cure many cases in the past was due to the removal of too little of the gland. From two-thirds to five-sixths of the gland should be removed, according to the toxicity of the case. If the greater part of both lobes is removed and a thin layer left with the posterior capsule, no damage will be done to the parathyroid, and sufficient gland will be left to maintain normal metabolism.

No isthmus should be left, for it is almost sure to develop and produce a noticeable and troublesome deformity.

The operation itself is comparatively simple. The anesthesia varies according to the choice of the individual surgeon. Some use ether exclusively; others, nitrous oxide; while a third group prefers local anesthesia.

The method which he has found most satisfactory is as follows: Morphia in sufficient dosage is administered subcutaneously to produce drowsiness. It is important to begin the administration of this about three hours before the time set for the operation. He repeats the dosage quantity to produce results in the individual case.

The patient is then placed in an upright position on the operating table, and the line of incision in a wrinkle at the base of the neck is infiltrated with 1 per cent novocaine. The skin is incised together with fat, platysma, and fascia. Flaps involving these structures are then turned up and down, and the sternohyoid and sternothyroid muscles and the deep fascia are exposed. The latter is incised in the median line, and this, with the extrinsic muscles of the larynx, is retracted on either side. In case of large tumors these muscles have been stretched so that it is rarely necessary to cut any of the muscle fibers.

The gland is exposed and lifted from its bed and removed, leaving the posterior capsules with a thin layer of gland and the parathyroid bodies. The isthmus should always be removed for reasons already mentioned.

A small cigarette drain should always be left in to drain the blood and free thyroid material. The fascia is closed in the median line, and the skin flap with two rows of sutures, to prevent the spreading of the scar, which is hardly noticeable if made in a wrinkle at the base of the neck, instead of over the most prominent part of the tumor. He usually uses a No. 1 plain catgut subcutaneous suture, which does not have to be removed, and makes a very little scar.

In a series of 208 operations on the thyroid gland, 80 per cent of which were for hyperthyroidism, the mortality has been a little less than 2 per cent. Two of the fatal cases died within twelve hours of acute hyperthyroidism, while a third passed away with acute abdominal disturbance, suggestive of mesenteric thrombosis.

Stanton thinks local anesthesia, with morphine narcosis, the selection of the proper time for operation in the individual case, resorting to palliative operations or injections of boiling water in order to prepare the patient for a radical removal, and finally the removal of sufficient gland, are the three important steps in the progress of thyroid surgery during the past decade.

Treatment of Tetanus.

In the *American Journal of the Medical Sciences* for June, 1921, FREEDLANDER states that large doses of antitoxin have been rather commonly used in the treatment of tetanus. By reporting four consecutive cases which recovered following the use of large amounts of antitoxin intravenously, he hopes to emphasize the value of this form of treatment.

The routine procedures adopted follow very closely those used by Woolf in reporting a successful case.

1. Antitoxin was given in dosages of 10,000 to 20,000 units, intravenously, several times daily until all spasm was gone.

2. Morphine hypodermically and chloretone by rectum are given every four to six hours during the stage of reflex hyperexcitability.

3. Liquid nourishment and large amounts of water are given every two hours.

Does a Negative Schick Test Indicate Present and Future Security from Diphtheria?

In the *Archives of Pediatrics* for June, 1921, PARK states that the Schick test can be compared with vaccination. A positive Schick reaction or a successful vaccination is a definite sign of a lack of immunity. A negative Schick or a negative result from vaccination is a strong suggestion of immunity, but not an absolute assurance. In both cases this uncertainty is because of doubt as to the potency of the product and the accuracy of the technique. In either case a repetition of the inoculation may be followed at times by a different result. Because of these facts it would be foolhardy to refuse to give a child antitoxin who had a history of a negative Schick test in the face of suspected diphtheria, just as it would be foolhardy to rely on a recent unsuccessful attempt at vaccination in the face of definite exposure to smallpox. Either improperly measured toxin or imperfect technique will probably prevent the development of the positive Schick reactions in susceptible persons. The failures are so few, however, that it is justifiable to consider that persons are in all probability immune who have a record of a carefully done negative Schick test.

It is very difficult to state to what slight degree, if any, a child or adult is liable to diphtheria who has enough antitoxin to prevent the development of a Schick reaction after a correct injection of the proper amount of toxin. An outbreak described by Blauner gives the nearest approach to proof that Park has met with, for the statement that such persons may under unusual conditions develop a moderate infection. The fact that the cultures from the different cases showed different agglutinative types of virulent bacilli is proof that the cases did not come from a single source. The additional fact that more than 50 per cent of the children in other rooms were carriers of virulent diphtheria bacilli and yet developed no symptoms of diphtheria is strong evidence that the antitoxin in them was sufficient under ordinary conditions to protect them. The final fact that in the last two cases the diphtheria bacilli were not even present shows that in this outbreak an infection other than diphtheria bacilli was capable of causing tonsillitis and was probably the primary cause. Considering all the facts together, it would seem to Park that in spite of sufficient antitoxin to give a negative Schick test these children were, after infection with pyogenic cocci, really infected with the diphtheria bacilli that were previously in their throats. He believes the antitoxin present in the cases would have prevented any appreciable development of diphtheria and that the cases would have recovered as certainly without the injection of additional antitoxin. It is not certain that the outbreak was not due to the pyogenic cocci alone.

Park and Zingher consider the Schick test most reliable, when the toxin is of proper strength and the method of employing it is correct, in showing the presence or absence of antitoxic immunity to diphtheria. A negative reaction after the age of two or three years indicates that the individual is protected, probably indefinitely, against the disease. The great majority of positive reactions in children are true reactions and indicate an absence of antitoxin, and therefore, unless other antibodies are present, a susceptibility to diphtheria. They consider the test of great value in determining clinically the efficiency of the immunization of susceptible individuals who have been injected with mixtures of diphtheria toxin and antitoxin. For this purpose only positive Schick cases should be chosen, and after the injections they should be tested one, three, six, and twelve months later to determine whether a sufficient amount of antitoxin had developed early or late to inhibit the Schick reaction, showing thereby the production of an active immunity to diphtheria. They use the Schick test to clear up the diagnosis of clinically doubtful cases of diphtheria. A negative reaction excludes diphtheria, while a positive Schick reaction leaves the diagnosis of diphtheria still a probability.

The Schick reaction has added further proof to the clinical and experimental observations that very toxic cases of diphtheria do better when given an early intravenous injection of antitoxin than when it is administered in any other way. It reveals the fact that an intravenous injection of antitoxin is able to partly neutralize toxin six hours after its absorption by the tissues, and thus gives us hope in some of the late cases of diphtheria. The results with the Schick test will serve as a reminder that after contact with the tissues for more than a few hours the effect of the toxin can no longer be prevented; that a day, and in fact hours, of delay in the administration of a therapeutic dose of antitoxin may mean not only the absorption but the final binding of a fatal dose of diphtheria toxin.

Test for Patient's Capacity for Operation.

In the *Ohio State Medical Journal* for June, 1921, McKesson states that we are occasionally asked to anesthetize patients who may be regarded generally as inoperable. Without the operation death may be inevitable, and with it, probable. If the patient is unable to withstand the burden of beginning narcosis, the operation ordinarily must be abandoned. But, he asks, how may we more surely determine that the patient will succumb during or immediately after the operation? How can we avoid the hopeless cases, without abandoning any which might be cured? The answer to these questions is difficult and depends upon many factors beside the resistance of the patient: Duration and character of operation; the surgeon, the anesthetist, the anesthetic, and the use of other agents calculated to prolong life. It is a delicate situation in which any one member in the team may cause disaster on the table, and in which the most intelligent coöperation of all may not avoid it.

The pulse may not be extreme in rate and the blood-pressure may be shamming. The real question is, how much reserve have we to draw upon, or will a slight interference break the delicate balance of pulse, blood-pressure, and respiratory relations, and initiate an immediate demise?

In presenting the value of blood-pressure guides in operation and surgical prognosis, Miller emphasized the value of Moots' rule for determining the index of the patient's resistance. This rule may be thus stated:

The pressure ratio, a fraction having the pulse pressure as numerator and the diastolic pressure as denominator, may be normal between 40 and 60 per cent. If the ratio lies between 25 and 75 per cent the case is probably operable; if outside these limits it is probably inoperable.

In checking up the accuracy of this rule in a series of 1000 cases, Miller found that in the operable risks 3.23 per cent of the patients died and 96.7 per cent recovered; in the inoperable risks 23.07 per cent of the patients died and 76.93 per cent recovered.

For determining the presence of operative shock under anesthesia a rule formulated from McKesson's own experience is an important guide. It is thus stated:

With a pulse rate of 120 or more, a pulse pressure of 20 mm. or less, and a diastolic pressure of 80 mm. or less in a patient, who at the beginning of the operation had presented normal pressure, frank shock occurred. If these low pressures are continued without improvement for more than half an hour, a vicious circle is generally established, which without treatment will cause the death of the patient.

In checking up the accuracy of this rule in the 1000 cases studied, Miller found that in patients who were within the danger zone as determined by this rule for more than twenty-five minutes, the mortality rate was 69.23 per cent.

In order to standardize the surgeon's and anesthetist's conception of circulatory depression, the following three degrees established by Moots and McKesson have been accepted by the National Anesthesia Research Society and included in their uniform Anesthesia Record.

These degrees of circulatory depression are:

1. *Safe:* Ten to fifteen per cent increase in pulse rate without change in pressure. Ten to fifteen per cent decrease in blood-pressure without change in pulse rate.

2. *Dangerous:* Fifteen to twenty-five per cent increase in pulse rate with fifteen to twenty-five per cent decrease in blood-pressure.

3. *Fatal:* Progressively increasing pulse rate above 120 with progressively falling blood-pressure of 80 mm. or less systolic, and 20 mm. or less pulse pressure, for more than 20 minutes.

Serum Desensitization.

MACKENZIE, in the *Journal of the American Medical Association* of June 4, 1921, states that despite the many obscurities with which the problems of human sensitization and desensitization are beset, experience has demonstrated beyond question that, before serum is administered, information regarding the presence or absence of hypersensitiveness should be obtained. One should find out whether the patient has had asthma or allergic rhinitis from horses, or whether he has previously been treated with serum, and if so, by what route the serum was administered. An intracutaneous test should be made with horse serum in 1:10 dilution, injecting 0.1 Cc. or less—preferably 0.02 Cc. A control test with physiologic sodium chloride solution, or better, with a 1:10 dilution of rabbit or sheep serum, should be made at the same time. One should wait half an hour before deciding whether the reaction is positive or negative. The interpretation of the mild type of positive reaction is not always easy; but if there is a definite enlargement of the small elevation caused by injecting the serum into the skin, and if this injection wheal is surrounded by a zone of erythema, the test is positive, provided the control test has not behaved in a similar way. The size of the wheal and its surrounding zone of erythema give a rough index of the degree of hypersensitiveness. A large wheal and a wide zone of erythema, and especially a wheal which has projections like pseudopods extending away from it, indicate greater hypersensitiveness than a small wheal without pseudopods and a narrow zone of erythema. There are, however, a few patients in whom the skin test fails to reveal a state of hypersensitiveness; at least he has observed one patient with a very definite history of allergic rhinitis from horses whose skin test with the dandruff protein was negative, but in whom symptoms of rhinitis could be readily produced by instilling a drop of an extract of horse dandruff protein into the nostrils.

If the patient has had asthma and gives a positive skin test, great caution is necessary. The first desensitizing dose should be given subcutaneously, beginning with a dose not larger than 0.025 Cc. The dose should be doubled every half-hour until 1 Cc. is given. Then 0.1 Cc. is given intravenously. After twenty minutes the dose is doubled. In case the therapeutic serum is to be given intravenously, the intravenous injections are continued, the dose being doubled every twenty minutes until 25 Cc. has been given without reaction. Four hours later 50 Cc. may be given, and after eight hours the treatment may be continued in the usual manner. In case a reaction occurs one should wait the usual interval, and then the last dose that gave no reaction or only a mild one is repeated. There is no evidence suggesting a cumulative action. The first portion of the serum should always be given very slowly and careful watch kept for respiratory embarrassment, cyanosis, skin eruptions, edema, and symptoms of collapse.

In case the therapeutic serum is to be administered intraspinally the subcutaneous doses should be carried out in the same way and four or five of the intravenous doses given, when, if there has been no reaction, the intraspinal route should be tried very cautiously. It should be realized, however, that in the exquisitely hypersensitive patients with bronchial asthma serum therapy may be impossible.

As for the patient who has previously been treated with serum, and is demonstrably hypersensitive by the skin reaction,

the same procedure should be followed, even though such patients probably never attain the same degree of hypersensitiveness as the asthmatic individuals with natural sensitization. It is probably quite safe with some of these less sensitive patients to shorten the desensitization programme in case the first few injections produce no reaction. This may be done by increasing the doses a little more rapidly than by doubling the preceding amount. The first intravenous dose should, however, never be more than one-tenth of the largest dose tolerated subcutaneously. It will be found that only very rarely is it impossible to desensitize the patient whose sensitization dates from a previous treatment. Finally, when attempting desensitization, one should never inject serum without having adrenalin at hand.

Serum Treatment of Lobar Pneumonia.

In the *New York Medical Journal* of June 15, 1921, NILES, in concluding his presentation on the serum therapy of pneumonia, lays emphasis on the following points:

1. An exact etiological diagnosis should be quickly made in every patient suffering with lobar pneumonia.

2. With very few exceptions Type I pneumococcus infections should be treated with Type I antipneumococcus serum.

3. The serum should be given in large doses (generally 100 Cc.) and repeated every eight hours until the temperature falls and remains below 102°; if it subsequently rises the administration of serum should be repeated unless complications, which should always be suspected, are determined.

4. The serum treatment should be commenced as early as possible; it should reach the vein at about the body temperature, and the first 15 Cc. should be given slowly.

5. Polyvalent serum should never be given, and Type I serum should be administered only to prove Type I infections.

6. The serum treatment above outlined reduces the mortality of Type I infection more than fifty per cent.

The Clinical Use of Radium.

DELAND in the *Boston Medical and Surgical Journal* of June 30, 1921, states that the large majority of superficial epitheliomata are successfully treated with radium. A lesion on the forehead, neck or face may be excised, if desirable, but lesions on the eyelids, inner canthus or nose are better treated with radium, for there is less deformity. Large lesions are often excised, cauterized, and radiated afterward, if necessary. Excision of these lesions for the purpose of having a pathological examination is not important. They are the type that metastasize very late in the disease, if at all, so that the removal of glands does not have to be contemplated. Epitheliomata of the ear does not respond as readily as others, partly because a smaller dose must be given. The cartilage is easily destroyed if a heavy treatment is given. This type occasionally does metastasize to the neck.

Keratoses of the face are easily destroyed by radium. Keratoses and precancerous lesions of the lips are also easily destroyed. However, it is his policy to treat with radium nothing but the earliest keratoses of the lip, except for palliation, in cases clearly inoperable. All cancers of the lip, or suspicious keratoses, should be removed by a V-shaped excision, the specimen examined, and a neck dissection done if indicated. These lesions metastasize to the neck very early, and the only safe way is to do the complete operation.

Cancers of the tongue (if inoperable), floor of the mouth, and tonsils are treated by the insertion of emanation tubes. Relief of symptoms usually follows, and occasionally an apparent cure. However, the neck metastases, if they appear, are not easily affected by radiation. *X*-rays seem to have more effect than radium.

Many cases of leukoplakia are relieved by radium. These are probably treated equally well by fulguration.

In cancer of the antrum, combined operation and radium treatment is the method of choice. The radium should be applied at the time of operation, after all the gross cancer has been removed.

Cancer of the esophagus does not do well under any form of treatment. Some cases are relieved by one or two radium treatments, but this is only temporary. In order to destroy the cancer, a treatment heavy enough to cause a severe reaction is necessary. This reaction is often serious enough to cause complete obstruction. Frequently the growth extends into the glands of the mediastinum and cannot be reached.

Radium has no value, either curative or palliative, in the treatment of cancers of the stomach or intestines.

Rectal cancer should never be treated with radium if it is operable. If inoperable, a colostomy should precede treatment. Otherwise the pain and tenesmus resulting from the necessarily heavy radiation are very severe—far worse than the discomfort of a colostomy.

Cancer of the breast, if inoperable, is best treated by *x*-ray. In some clinics radium is used, but a very large amount is needed to get the same results given by *x*-ray. Local implantations may be used to destroy some of the nodules, but this does not take care of the glands.

Cancer of the thyroid may be treated by the insertion of emanation tubes, but *x*-ray is probably better.

Many cases of cancer of the larynx are relieved by radium therapy, but few permanently. Combined operation and radium works well in certain cases. Necrosis of the laryngeal cartilage must be guarded against. Tracheotomy must precede treatment, otherwise the reaction may complete the obstruction.

Prostatic cancer may be treated by the insertion method through the peritoneum or by the intraurethral route. Probably the best results are by the combined operative and radium method. Results, as a rule, are not very good.

Opening of the bladder and the insertion of emanation tubes is the best way to treat vesical cancers, although they may be treated by the use of cystoscope and by applicators inserted in that way. Female bladders are more easily treated than those of the male.

Cancer of the uterine fundus is best treated by hysterectomy. If hysterectomy is contraindicated, good results are secured by intrauterine radium treatments.

In cancer of the cervix which involves the broad ligaments or encroaches on the vaginal wall and is therefore inoperable, the treatment of choice is the insertion of numerous tubes into the cervical growth, combined with steel-screened intrauterine radium treatments. Preliminary cauterization is not advisable, for the cauterization accomplishes no more than the radium, and if done at a separate sitting, it involves a loss of time. Treatment by the former method promises good results. Nearly every patient is relieved of pain, bleeding, and discharge, and some are clinically cured by radium. Cancer of the vulva and vagina is treated by insertions.

Large fibroids of the uterus should be removed by operation, if operation is not contraindicated. Many smaller fibroids are relieved by intrauterine radium therapy. Relief is also given to certain obscure cases of menorrhagia.

Keloids respond readily to radiation. It has been found that they disappear more quickly if a moderately heavy treatment is given rather than a heavily screened treatment.

Cavernous nevi are easily destroyed, but port-wine marks are more resistant, requiring numerous treatments. Hairy and pigmented nevi respond fairly well. Radium is to be preferred for these lesions in children, for the treatment is painless. Warts, occasionally lupus, psoriasis, and lichen planus, which are resistant to other treatment, may be destroyed by radium.

Radium is now the accepted treatment of myelogenous leukemia. The white count and the large spleen are reduced by one or two treatments. The effect is only temporary, for later the spleen enlarges and the white count rises. A second series of treatments has less effect than the first, and so on, until finally the patient dies. Lymphatic leukemia may be helped for a time, but the relief is more temporary than in the other type.

Hodgkin's disease, malignant lymphoma, and lymphosarcoma, as a rule, are easily influenced by radiation. The story is much the same as in leukemia. At first they respond quickly, but when they recur they are more resistant. When radium loses its effect, the end comes very quickly. Certain of the Hodgkin's cases belong to the so-called chronic type and live several years with an occasional treatment. Usually they die from enlargement of the abdominal retroperitoneal or mediastinal glands.

Metastatic glands of squamous-cell cancer are not affected much by radium. A few cases have been treated by the insertion method, and the glands have become smaller. The glands do not disappear unless they are entirely destroyed, and this endangers neighboring vessels and nerves.

Sarcoma of the small-cell type responds to radium therapy better than the spindle-cell type. Combined operative and radium treatment is frequently the best. If radium is used alone, the insertion type of treatment gives the best results. Many tubes should be inserted into the periphery of the growth.

Vaccine Therapy in Gonorrhea.

In the *Journal of the Royal Army Medical Corps* for June, 1921, BOYD states that only 44 cases were complete in the vaccine series, and 36 in the control series, and the total number of cases involved in the statistics is therefore 80.

	Control.	Vaccine.
Average stay in the hospital.	56 days	63.4 days
Prostatitis.....	11.1 per cent.	9.1 per cent.
Epididymitis.....	———	4.54 per cent.

Average Stay in Hospital.—The vaccine series required seven more days in the hospital than the control. However, a larger number of control cases was outstanding, and not included in the statistics, and these would help to level out the results in the two series, as the reason for their being outstanding is that they have been an unduly long time in the hospital.

Prostatitis.—There is no appreciable variation.

Epididymitis.—Two cases occurred in the vaccine series, none in the control series.

In both the control series of cases the average stay in hospital is shorter. This, however, is probably due to causes other than the administration of the vaccine. There is little variation in the other factors. The slight reduction of epididymitis in the vaccine series in the first experiment did not hold in Experiment 2.

The Influence of the Electric Current on the Absorption of Drugs.

In the *Proceedings of the Royal Society of Medicine* for June, 1921, INCHLEY states the results of experiments made to determine the amount of absorption of drugs through the skin by means of the electric current. Rabbits, cats, or guinea-pigs were used, anesthetized with urethane. The electrodes employed are described. The amperage, time, the area of skin treated, and the concentration of drug are given in each case. Absorption through the skin was proved in the case of atropine, aconitine, and the cyanide ion; tracings showing the known pharmacological effects of the drug being recorded on the kymograph in each case. With strychnine return of reflexes was obtained. Absorption of iron from ferrous sulphate solution was shown by increased percentage of iron in the skin and underlying muscle determined by chemical estimation. Calcium absorption, from calcium chloride, was proved by its effect in reducing the clotting time of the blood to half the normal.

Experiments on the knee-joint are described showing absorption through the skin of the salicylate ion and of the ferrocyanide ion; penetration was estimated by staining the excised and opened joints with ferric chloride or ferrous sulphate solution respectively. The current caused no deeper penetration than could be obtained by simple subcutaneous injection of the same concentration of drug under the skin covering the joint. Thus, with potassium ferrocyanide solution there was more intense staining of the deeper tissues (cartilages of femur, tibia) when injected subcutaneously than when introduced by the current. With

sodium salicylate no penetration into the joint occurred either when injected subcutaneously or when introduced electrically. The superficial tissues (outer surface of capsular ligament, patellar tendon, and fascia) in one experiment were equally well stained by both methods of introduction, while in another there was intense but superficial staining in the electrically treated joint, but very slight staining in the injected one.

Cinchophen, Neocinchophen and Novaspirin in Rheumatic Fever.

In the *Journal of the American Medical Association* of June 18, 1921, HANZLIK, SCOTT, WEIDENTHAL, and FETTERMAN, in concluding their article on this subject, state:

1. Cinchophen gave partial relief from symptoms in rheumatic fever with doses of from 3 to 6 gm., and complete relief with doses of from 10 to 13 gm. (seven patients), while neocinchophen required a somewhat higher range of dosage, namely, from 3 to 8 gm. for partial and from 11 to 16 gm. for complete relief (three patients).

2. Novaspirin was therapeutically worthless in the treatment of rheumatic fever (three patients), not giving even partial relief from subjective symptoms. This is due to inadequate concentration of salicyl in the tissues, as indicated by the low (from 14 8 to 23.4 per cent) excretion of salicyl in urine after large doses of the drug.

3. Large doses of cinchophen and neocinchopen, such as are necessary in the treatment of rheumatic fever, produce characteristic symptoms of salicylism ("toxicity"), which, however, are less pronounced than those caused by corresponding doses of salicylate. Cinchophen differs from salicylate by causing epigastric pain, owing, presumably, to local irritation by the drug. Pain in the epigastrium was absent after large doses of neocinchophen, presumably because of its relatively low solubility in water and weak alkalies, possibly also because it is an ester.

4. Large doses of cinchophen were found to slow the pulse rate of both febrile and afebrile individuals, and the same occurred after neocinchophen in febrile patients. Therefore the cardiac slowing produced by cinchophen is due to a direct depressant action on the circulation.

5. Cinchophen is injurious to the kidney, as indicated by the occurrence of albuminuria, and sometimes casts and white blood-corpuscles, in the majority of seven individuals that were observed, and a diminution in the excretion of phenolsulphonephthalein in the five individuals that were studied. Neocinchophen is variable, albuminuria and a diminution in the excretion of phenolsulphonephthalein occurring in about one-half of the nine individuals that were observed.

6. As compared with salicylate, cinchophen appears to be about equally efficient, while neocinchophen is somewhat less efficient, as judged by the dosage necessary for therapeutic relief in rheumatic fever. The symptoms of "toxicity" are about the same and renal injury somewhat less after cinchophen, and both the "toxicity" and the renal injury are less pronounced after neocinchophen than after salicylate in corresponding doses.

The Effect of Pituitary Extract on the Rate of Urine Formation in Man.

In *Southern Medicine and Surgery* for June, 1921, MCBRAYER states that the preparation used in his study is the obstetrical pituitrin made by Parke, Davis & Company, who, in a recent personal communication, state that this product is a quantitatively standardized aqueous extract of the infundibular portion of the pituitary gland, and that obstetrical pituitrin is just one-half as concentrated as surgical pituitrin. This product was used because he believes with Rowntree that for such studies it is probably the best preparation available.

The manufacturers' statements concerning the pharmacologic action of this preparation agree with the statement in that admitted authority, Cushny's text-book, "Pharmacology and Therapeutics, or the

Action of Drugs," which says that "when injected intravenously the blood-pressure rises;" that this "rise in pressure is due to the constriction of the peripheral arterioles, as is shown by the lessened volume of the organs." He concludes that "the pituitary substance must act directly on the muscle fiber" because this action is not interfered with by severing the vasoconstrictor nerves or by paralyzing the myoneural junctions with ergotoxin. However, this constrictor action on the arterioles seems not to be without exception, for the same writer finds that "one of the earlier observations was that pituitary injection was followed by a profuse secretion of urine, generally accompanied by dilatation of the renal vessels and an increase in the volume of the kidney," though there is some conflicting evidence to prove that this is the complete modus operandi in the diuresis. Cushny's statements are arrived at by reasoning from analogy, in that they are mainly based on animal experimentation. Norris states practically the same thing in the third edition of his "Blood Pressure and Its Clinical Application:" "It (pituitary extract) also has a diuretic effect due to direct stimulation of the renal cells, usually aided probably by a concomitant vasodilatation, because there is no constant relation between pituitrin diuresis and either systolic or pulse pressure or the ratio between them."

Realizing that his series of studies is numerically small, however, knowing that the facts were obtained in a very detailed and accurate manner, and furthermore appreciating the utmost consistency in the results, McBrayer feels that the following conclusions are warranted:

1. During the first hour following the hypodermic injection of medicinal doses of pituitary extract the urine output is markedly decreased.

2. During the same period of time the total output of urinary solids is markedly decreased, both relatively and actually.

3. During the same period of time there is a marked and constant decrease in the systolic, diastolic, and pulse pressures; and pulse rate, which decreases, appears to be definitely related to the decrease in the fluid and solid output of the urine.

Liver Regeneration Following Chloroform Injury as Influenced by the Feeding of Casein of Gelatin.

In the *Archives of Internal Medicine* for June, 1921, DAVIS and WHIPPLE state that gelatin, although an "incomplete protein," seems to be equally as efficacious as casein in the regeneration of liver parenchyma destroyed by chloroform.

After a 50- to 60-per-cent necrosis, a feeding period of nine days with either substance will restore the liver to within 10 or 15 per cent of normal. This liver cell regeneration is comparable to that obtained with a meat diet, approaches that given by a high carbohydrate diet, is definitely less than with a full mixed diet, but greater than with a fat diet or with fasting.

The liver repair on gelatin feeding emphasizes again the important fact that the body is able to conserve certain amino acids or split products from its endogenous wastage products and recast these groups into the complex liver cell.

The Use of Pituitrin by Mouth in Certain Cases of Uterine Hemorrhage.

In the *Proceedings of the Royal Society of Medicine* for June, 1921, DONALDSON states that it is never an easy task to demonstrate the therapeutic value of a drug, and the difficulty is increased when the drug is used for a minor ailment which does not necessitate the patient being under continuous observation. Such then is the difficulty he has had to contend with in trying to prove that pituitrin by mouth is a most valuable drug in treating certain cases of uterine hemorrhage.

He has been using pituitrin for about eighteen months, both in private and in the hospitals to which he is attached.

Every patient complaining of uterine hemorrhage is carefully examined to ex-

clude the possibility of carcinoma, large fibroids, or other condition requiring urgent operation. This then leaves for treatment cases of endometritis, small fibroids, retained products of conception, cases of menorrhagia and epimenorrhea, including those cases in which the exact cause cannot be diagnosed but is probably ovarian in origin.

The drug is always prescribed in tablet form 2 grains three times a day after food. It has been suggested that it should be given in a fluid form, in order to promote absorption by the stomach.

In two of the hospitals he has treated about fifty cases in the last six months. Of these, thirty-seven responded to treatment, some within a few days. Of the remainder, four did not return to report; five were subsequently admitted and found to have polypi, etc., and in four the notes state definitely that no improvement took place.

In private he has had cases which responded to pituitrin after being treated for weeks with ergot and other drugs.

Personally, he is convinced of the value of pituitrin by mouth, and this opinion is shared by all the clinical assistants and house surgeons he has had working with him.

Surgical and Genito-Urinary Therapeutics

The Early Diagnosis of Acute Abdominal Infections.

Eccles (*British Medical Journal,* May 7, 1921) writing on this topic holds that acute appendicitis is the most frequent cause, constituting over 70 per cent of all cases; intestinal obstructions 18 per cent; perforations 7.2 per cent; cholecystitis 2.4 per cent; torsion of the pedicle 1 per cent; acute pancreatitis one-half of 1 per cent.

In the adult female three other conditions have to be thought of, namely, rupture of ectopic gestation, acute salpingitis, and acute inflammation of the uterus, such as follows septic infection in criminal abortion, and lastly acute basal pleurisy or pneumonia, or even the pain prior to the vesicular eruption in "shingles," may simulate the acute abdomen.

There are certain features which are common to every case of "acute abdomen." Two of these stand out preëminently, namely, "acuteness" and, if one may be allowed to coin the word, "abdominalism."

Acuteness is evidenced by sudden onset and rapid development of signs and symptoms.

Abdominalism is evidenced by the fact that the abdomen is obviously the site of the lesion.

The characteristic signs and symptoms of an "acute abdomen" are: Sudden onset, abdominal symptoms, anxious expression, rising pulse rate, often an attack of vomiting, sometimes repeated, temperature out of relation to pulse rate, abdominal pain, often tenderness and rigidity of the muscles of the ventral abdominal wall. When a patient presents all these signs and symptoms together, the case is one which may be classed as a surgical emergency.

A sudden onset, severe pain often near the umbilicus, one attack of vomiting, a rising pulse rate, out of proportion to the rise in temperature, and rigidity of the lower half of the right rectus, are sufficient to diagnose appendicitis in its early stage and to call for operation at once.

Perhaps nothing gives rise to an "acuter abdomen" than the perforation of a hollow viscus. The stomach, the duodenum, the appendix, and the gall-bladder may all give way, and their contents pass into the peritoneal cavity, producing the most alarming signs and symptoms.

To take a typical case of the perforation of a duodenal ulcer in a male. He is at

work when a sudden agonizing pain seizes him in the upper half of the abdomen. He is doubled up, and gasps for breath, because his diaphragm will not descend. He assumes the horizontal position and vomits. When now examined he appears most anxious, his pulse is small and rapid, there is still much pain in his abdomen, the whole of the ventral abdominal wall is rigid, and particularly the upper half of the right rectus. Even upon the foregoing signs and symptoms the practitioner is quite warranted in diagnosing a perforation, and preparations should be made for an immediate operation.

Various structures within the abdomen may possess pedicles. If the pedicle of any tumor or organ becomes twisted there is immediately interference with the circulation of blood in the attached structure.

The following are some of the intra-abdominal torsions which may occur: Ovarian cyst; subperitoneal uterine fibroids; "floating" kidney; wandering spleen. Of these, the twisting of the pedicle of an ovarian cyst is far the most common. If this happens suddenly, a condition which may aptly be called an "acute abdomen" follows.

It is the so-called hemorrhage variety of inflammation of the pancreas which gives rise to symptoms of an "acute abdomen." The lesion is due to a rapid infection of the pancreatic tissue via the duct, or possibly through the blood, by a streptococcus. The onset of the symptoms is sudden, so sudden that the patient is hors de combat in a few minutes. This is probably due to the loss of blood into the pancreatic tissue producing a profound shock similar to a blow on the "pit of the stomach." There is abdominal pain, referred to the epigastrium at first, and soon to the back in the lumbar region. Vomiting occurs, but is not persistent. The pulse rate quickens and the volume of the pulse is less. The temperature may fall while the pulse goes up, but later there is a rise of temperature. A very characteristic sign occurs even in the early stages, and it is one which serves to distinguish this cause of an "acute abdomen" from all the others. The patient's face and extremities are distinctly cyanosed, and there may be some dyspnea.

There are certain other conditions which, while they may give the patient very severe distress, nevertheless do not place his life in danger. He refers to what may be termed "the colics"—intestinal, renal, or biliary.

We have all seen patients suffering agonies from each of these spasmodic contractions of unstriped muscle, but very few of us have ever seen death occur primarily on account of any one of them. Intestinal colic is very common, and unless very severe it does not produce a condition which really simulates an acute abdomen. There is one sign which is of great importance, and that is that pressure upon the abdominal wall tends to relieve the patient's pain. Of none of the lesions producing an "acute abdomen" can the same be said. It is so characteristic that pressure causes pain in the serious condition, and does not do so, but actually relieves it, in simple colic; that if there is tenderness on pressure associated with any other symptoms of an "acute abdomen" it is better to diagnose the presence of a lesion which is a menace to life.

Poisonings occur and simulate an "acute abdomen." There is generally, however, a definite history of the intake or absorption of an irritant substance which helps the diagnosis.

Role of the Prostate and Seminal Vesicles in Arthritis.

LOWSLEY (*New York Medical Journal*, May 4, 1921) observes, in the treatment of arthritis, that better results were obtained by operation than by any other means. The use of internal medication was least helpful. Local applications to the joints were serviceable in about three-fifths of the cases. Gonococcal vaccine, used in 16 cases, was at least temporarily beneficial in 10. Palliative treatment of the prostate and seminal vesicles in 9 cases gave 2 cured, 5 improved, and 2 unimproved. Plaster casings and splints were used in 23 cases. Improvement followed in less than 50 per cent of the

cases, but the series of six cases treated by heavy casts to the joints and baking afterwards were singularly successful, all showing marked improvement. Operations on the seminal vesicles showed improvement in nine cases out of ten.

The Prevention and Treatment of Puerperal Infection.

BELL (*British Medical Journal*, May 14, 1921) notes that one of the most disturbing features of the mortality rate in regard to puerperal sepsis is the fact that the maternal mortality from infective conditions, which to-day should be almost negligible, is not decreasing as we have a right to expect. Indeed, in the Registrar-General's last annual report the mortality is shown to be greater than in any previous year for fourteen years. It is probable, moreover, that if we could exclude the epidemics that used to occur in maternity hospitals and in the practice of certain midwives, and which we now know were the result of easily preventable contagion, the present mortality rate would be found to be not greatly different from that obtaining in preantiseptic days. In other words, while epidemics have been banished, the isolated case still runs an undue risk from causes that are preventable. Another important matter brought to light by recent statistics is that cases attended by doctors more often suffer with puerperal sepsis than those attended by nurses alone.

We all know the athletic young woman with her resistant pelvic floor, and the woman "living on her nerves" who will not willingly or cannot tolerate a normal, let alone a tedious, inert labor. We are well acquainted with the stunted growth and small pelves of many women in factory districts. But allowing for all these embarrassments, which are the penalties of modern life, there is still a large number of cases in which interference is practiced without scientific indication.

Twenty-five years ago "meddlesome midwifery," as it is called, was much less common than it is to-day, in spite of the fact that most of the procedures now practiced by the general practitioner, such as internal version and forceps delivery, were then in vogue.

Many make a practice of terminating with forceps nearly every labor at which they are present—more often than not with forceps taken from a "midwifery bag" which is far from clean and very imperfectly sterilized.

If the maternal mortality and morbidity rate is to be diminished, to say nothing of the number of operations for prolapse and other lesions due to hurried parturition, this practice must stop. It must be held to be a discreditable thing to terminate labor with forceps to placate the patient or to save the time of the practitioner, however skilful he may be.

There must be an honest recognition by all who attend childbirth that puerperal infection is almost always avoidable, and that the appearance of it in any case that has been examined, or in which interference has been practiced, is a serious reflection on the accoucheur or accoucheuse. If the whole profession would combine in an attempt to reduce the present incriminating figures a great change would be noticeable, not only in the statistics presented by the Registrar-General, but also in the health of the female population which is perpetuating our race.

The remedy does not lie in better teaching, so far as practitioners are concerned, but in obedience to the dictates of conscience. No man can plead ignorance of asepsis and antisepsis to-day. The trouble is that imperfect asepsis is practiced as a sop to conscience instead of complete asepsis as a real scientific safeguard.

Examination per rectum with the gloved finger should be practiced in the case of the parturient woman in preference to vaginal examination. Forceps delivery is far too common. Most women deliver themselves safely if left alone. Forceps delivery, when necessary, is a surgical operation, and should not be conducted in insanitary surroundings.

All lacerations, not only those of the perineum, must be efficiently sutured.

Care must be taken to maintain the natural defences of the patient.

With regard to the treatment of puerperal infections the chief conclusions are:

The evacuation of large pieces of placenta and efficient antiseptic irrigation of the uterus should be practiced in the early stages of infection of the placental site. All infected lacerations should be purified.

The employment of autogenous vaccines and polyvalent serum is often useful in cases of generalized infection.

Major operations must be performed, especially ligation of the veins in puerperal thrombophlebitis, without hesitation and in good time when indicated.

As to the more general considerations, the principal conclusions are:

Much research is required to define more accurately and fully the general and local defences against infection in the normal parturient woman, and the causes that lead to their diminution.

The immediate reception and accommodation of all cases of puerperal infection into a special ward connected with gynecological and obstetrical clinics, where each can be adequately investigated and efficiently treated, should be possible.

Aseptic midwifery is prohibitory, costly to the general practitioner in comparison with the fees obtaining in the poorer parts. In every district a depot should be established by the local authority from which the general practitioner could obtain a sterile outfit free of cost.

The present statistics are an urgent indication that better organization is required. In various centers, especially in industrial districts, large maternity and gynecological clinics should be instituted. When possible they should be attached to the teaching schools. These clinics should form base hospitals for wide areas, in the outlying parts of which a few beds should be set aside in existing cottage hospitals, or, failing these, small field hospitals should be established for the reception of maternity cases. In these field hospitals general practitioners would have an opportunity of working under the best conditions when interference was necessary. In cases of special difficulty skilled assistance could be summoned from the base hospital, if the patient were too ill to be moved. Whenever difficulty was anticipated the patient could be sent before the commencement of labor to the base hospital for delivery.

The Present Status of the Local Anesthesia Problem.

BRATRUD (*Minnesota Medicine,* April, 1921) observes that there are at present no statistics available as to the rate of deaths under local anesthesia. Occasionally a case is reported, as death from local anesthesia, from apparently non-toxic substances, such as novocaine. Every person knows or should know the toxicity of cocaine, and that it is about as dangerous an anesthetic as could be used in major surgery. A number of deaths have been reported from comparatively minor operations. The death-rate from general anesthesia, under ether, has been stated to be 1 in 10,000, under chloroform 1 in 3000, and under gas-oxygen about the same as chloroform, when given by a skilled anesthetist. Statistics recently collected by Salzer and Stewart give the mortality rate from general anesthesia at 1 in 600, but the author doubts not that it is even greater than this, except in well-organized clinics, where trained anesthetists are available.

Morris has shown by tests that acetone bodies are present in the urine after ether anesthesia. With lowered carbon dioxide combining power of blood, there is an increased retention of nitrogen. It is a well-known fact that, where the carbon dioxide combining power of blood in diabetics is lowered, there is an increased formation or retention of blood sugar. In a series of cases Short shows the carbon dioxide combining power of the blood to be decreased 4 to 17 per cent under ether, the anesthetic varying in duration from twenty-six to seventy minutes. The drop is greater from

chloroform. Killian has shown that the drop is much less under spinal or gas-oxygen anesthesia. The fact that the mortality rate in surgical diabetics has been reduced from 6 per cent under general to 3 plus per cent under local anesthesia, speaks for itself.

Preventable deaths from anesthesia may be divided into three groups: (1) those resulting from the anesthetic itself; (2) faulty administration; (3) pathologic and physiologic causes in the patient. Some drugs used for local anesthetics are practically non-toxic, for example, novocaine and saligenin. As regards the administration of local anesthesia, it is done, on the whole, with precision and knowledge on the part of the anesthetist. General anesthesia may be the choice in well-organized clinics, where trained anesthetists are available, where the functional state—*i.e.*, cardiac reserve, renal function, metabolism, and so forth—has been well determined. It is not the well-organized clinics that have a high death-rate from anesthesia, but it is in the smaller cities, rural districts, or the hospitals, where the system is at fault and no trained anesthetist is available.

There are a few requirements necessary to the successful induction of local anesthesia:

Careful attention to essential details. These can be learned from any text-book, and unless known will mean failure.

Less manipulation of the tissues is entailed, and this means better technique. Exploration is made more by visual examination than by digital. If digital examination is necessary, combined anesthesia may be used, provided it cannot successfully be made under local. This does not require the stage of surgical anesthesia, but the stage of analgesia is sufficient. The surgeon should know the limitations and not subject any patient to pain, for shock can be produced from pain in this manner, just as easily as from any added trauma.

Coöperation of the patient and surgeon, combined with preoperative coöperation of nurses and attendants. Suggestive remarks at time of admittance may destroy the confidence of the patient. This applies equally well to any procedure that transpires in the surgical amphitheater. Suggestive remarks by attendants or friends, such as "Are you having pain?" create an impression which may lead to loss of mental control.

In regional blocking knowledge of anatomy is essential.

In abdominal work, vertical retraction, combined with a position of patient calculated to secure negative abdominal pressure so essential to a successful visual examination, should be used. Digital examination can be made, provided no tension or traction is made upon the mesentery. The visceral peritoneum is not sensitive to pain, as far as we know, except in acute or subacute inflammatory conditions, but any manipulation of the parietal peritoneum will cause pain. The parietal peritoneum is very sensitive. Packing can be used if properly performed, but in a majority of cases it is only called for to prevent soiling of the field.

Dealing with the same subject Maxeiner favors novocaine as an efficient, non-toxic drug, one that can be used almost *ad libitum* as a local anesthetic of choice. To produce satisfactory anesthesia in major surgery it is imperative that large quantities of the solution be used. The control of absorption influences both toxicity and the duration of anesthesia. This will be accomplished by the use of adrenalin and, when possible, of a tourniquet. Adrenalin should not be used in the presence of a terminal circulation, as in the case of the finger or the penis, because of the danger of gangrene.

The simplest method of producing local anesthesia is the infiltration or the edematization of the tissues in and about the site of the operation. However, in many cases, regional methods are to be preferred. By the regional methods the nerves are blocked proximally to the site of the operation, and this is necessarily a more difficult procedure, demanding a thorough knowledge of the nerve supply to the operative field.

Regional anesthesia includes the following methods: (1) intraneural injections;

(2) paraneural injections; (3) spinal analgesia; (4) intravenous injections; (5) intra-arterial injections; (6) circumferential infiltration of Hackenbruch; (7) caudal anesthesia.

The paraneural or infiltration block, and the circumferential infiltration of Hackenbruch, are the simplest and the most commonly used. The others are more dangerous and require a certain technique which renders them more difficult.

The primary requisite is a number of good syringes, preferably of glass or metal, that will not leak even under high pressure, together with an assortment of needles, varying from 1 to 4 inches long and in caliber from 18 to 24, which will not become detached during use. The self-filling syringes and the Farr pneumatic injector possess great advantages over the ordinary syringes and render the injection more simple and more rapid.

For infiltration, infiltration block (paraneural), and caudal anesthesia, 5-10 to 7-10 per cent novocaine in Ringer's solution (with 3 to 5 minims of adrenalin 1:1000 to the ounce) has proved most satisfactory, while for intraneural injections 1 to 2 per cent novocaine in Ringer's solution is used with the same proportions of adrenalin.

Hypodermics of morphine and scopolamine may be given preliminary to the operation if neuro-local anesthesia is desired.

After first warning the patient, a very fine needle is introduced and a wheal made in the skin. A second needle of slightly larger caliber, 2.5 to 3 inches long, is introduced through this wheal into the subcutaneous tissues, injecting continuously as the needle advances. It is then run along subcutaneously for 2.5 inches, where a second wheal is made in the skin, but this time from beneath. Through the second dermal wheal the needle may be introduced painlessly at once. By then introducing the needle vertically through the anesthetized skin, the deeper layers may be infiltrated in the same manner until all the tissues through which the incision is to be made have been edematized. For the ordinary midline incision the injection has been made and the abdomen opened painlessly in six minutes.

A most important point in the technique little emphasized is to always inject with the needle advancing or during its withdrawal, but never with the point stationary, because of the danger of an intravenous dose.

One of the best examples of this method is the brachial anesthesia of Kulenkampff. A wheal is made in the skin over the midpoint of the clavicle. With the finger over the subclavian artery, a long fine needle is introduced through the wheal downward, inward and backward, pointing in the direction of the second dorsal spine. Sensation referred to the little and ring fingers indicates the point for injection. Ten Cc. of a 1- or 2-per-cent novocaine solution is usually sufficient for complete anesthesia of the whole arm. The needle should be introduced unattached to the syringe, or if attached aspiration should be attempted to avoid an intravenous dose. The main objections to this method are that it is not absolutely free from danger and is technically difficult.

Paraneural injection or infiltration block about the nerve trunks edematizes the tissues. It is a much more simple procedure and very effective, especially when reënforced by subdermal infiltration at the site of incision. By the combined methods the cervical nerves may be anesthetized at their exit by infiltration block, reënforced by subdermal infiltration at the site of operation, permitting bloc dissection of the neck, thyroidectomies, laryngectomies, and so forth, to be done without pain. An infiltration block of the cervicals, together with the upper six thoracic nerves reënforced by subdermal infiltration, will permit radical amputation of the breast with dissection of the axilla to be done very satisfactorily. The combined method is also ideal in inguinal hernia, where edematized tissue may interfere with their identification. Here an infiltration is made under the skin along the line of the incision and the ilioinguinal and iliohypogastric nerves are blocked under the external oblique fascia near the anterior

superior spine. The genital branch of the genitocrural nerve is blocked after exposure of the cord.

In case of the extremities a subdermal infiltration may be made completely around the limb. Through this anesthetized ring the needle is introduced at right angles forming a transverse plane of infiltration completely through the extremity, depositing most of the solution in the neighborhood of large nerve trunks. The anesthesia is equally applicable to arm or leg and is complete and safe. It is surely a much safer procedure for the doctor, who alone must amputate or reduce a fracture, and give the anesthetic at the same time, in such an unfavorable location as a farm-house or in his office.

In abdominal surgery under local anesthesia, one must constantly bear in mind certain painful points that must be anesthetized, such as the round and broad ligaments, the ovarian pedicle, the mesoappendix, the mesentery, and the tissues of and about the bile ducts. These should be infiltrated before any attempt is made to handle them. Since the utmost care must be exercised at all times, to reduce trauma to a minimum, this teaches the surgeon a wholesome respect for tissues; the final results of which are less postoperative vomiting, fewer gas pains, and a generally less stormy convalescence.

Cerebral Hemorrhage of the New-born.

IRVING (*Boston Medical and Surgical Journal,* May 26, 1921) states that cerebral hemorrhage is undoubtedly the most common cause of death in the first week of infancy. Warwick found it present in 50 per cent of autopsies on the still-born and the new-born, and Spencer in 40 per cent. In over 12,000 consecutive births at the Boston Lying-in Hospital the diagnosis of cerebral hemorrhage was made in 41 cases, which is about once in 300 deliveries. This figure gives no proper idea of its frequency, as only those cases have been considered which were proved by autopsy or in which, during life, the signs of intracranial bleeding were unmistakable. Still-births, and deaths from asphyxia, or from unexplained causes, were not included.

We now know there are at least three ways in which cerebral hemorrhage of the new-born may originate. These are: (1) from intrauterine asphyxia; (2) as one of the many manifestations of hemorrhagic disease of the new-born; and (3) from the trauma of either operative or spontaneous delivery.

Intrauterine asphyxia results from some mechanical obstruction to the fetal circulation.

During labor we have a retraction of the muscle fibers of the uterine wall, which, if allowed to continue indefinitely, will result in tonic contraction of the organ. Should the membranes rupture early, this retraction is especially marked. It occurs at the placental site, as well as in the other portions of the uterus, and the result is a slow diminution of the blood supply to the fetus. Impaired oxygenation causes an asphyxia which so raises the fetal blood-pressure that cerebral apoplexy is the result. Over 25 per cent of cases at the Lying-in Hospital had a first stage which lasted over twenty-four hours. Had this been shortened by appropriate measures the author believes that many of these babies would have been saved.

The forceps have been blamed many times as the cause of cerebral injury, when had they been used earlier the injury might have been avoided.

In another 25 per cent of the author's cases, cerebral hemorrhage was apparently but part and parcel of hemorrhagic disease of the new-born. In these cases hemorrhages were found in regions of the body other than the cranial cavity. Moreover, eleven cases of cerebral hemorrhage followed normal or precipitate delivery, and one followed Cæsarian section. In none of these was the trauma of delivery or asphyxia present. We are therefore led to the conclusion that these cases were due to hemorrhagic disease, since the other two causative factors were lacking.

The trauma of delivery may cause rup-

ture of the cerebral vessel with resulting extensive hemorrhage. Compression exerted by forceps applied to an unfavorable diameter of the fetal head, as well as the sudden change in intracranial pressure when either the forecoming or the aftercoming head is violently pulled through either the superior or the inferior strait, may result in much damage. The author believes that the only safe application of forceps is over the sides of the baby's head. In this case, when a properly designed instrument is used, and there is no disproportion between the child's head and the mother's pelvis, the forceps tend to protect the skull rather than to damage it.

The diagnosis of cerebral hemorrhage of the new-born is a matter of the greatest importance. The immediate mortality is excessively high, in the author's series 95 per cent, both with and without operation. Since these children, should they survive the first few days of life, are apt to become the victims of cerebral paralyses or degenerate into hopeless idiots, it is absolutely necessary that the condition should be recognized immediately, and every attempt made to prevent such a disastrous outcome. These babies, in the early hours or days of life, exhibit certain peculiarities which should not fail to attract the attention of the physician. They may have recurrent attacks of cyanosis and apnea, often without any other visible abnormality.

This is especially apt to be the case in the subtentorial hemorrhage, where the extravasated blood causes an increase of pressure on the medulla, and results in respiratory symptoms. In these cases lumbar puncture will reveal bloody spinal fluid, and often the condition of the child will improve strikingly, for a time at least, upon the relief of pressure by this procedure. One of the author's cases was, so far as he knew, cured by repeated lumbar punctures. It left the hospital in good condition, and was normal in every way four months later.

In other cases there is little to be noted at first, except that the child does not seem quite right. It refuses to nurse and often has a characteristic, continuous and monotonous cry. Sometimes, on the contrary, it lies quietly and is difficult to arouse. As time goes on, nystagmus, inequality of the pupils, twitching, convulsions, and spasticity of the extremities develop, and there may be retraction of the neck or opisthotonos. The anterior fontanel is apt to show a varying degree of bulging, depending upon the degree of intracranial pressure. In massive hemorrhages pallor is a striking sign.

If there is any question of intracranial hemorrhage, a lumbar puncture should be done. The anterior fontanel may also be aspirated with a needle and syringe, avoiding the midline under which lies the superior longitudinal sinus. Naturally this procedure will be negative unless the extravasated blood lies beneath. The coagulation and bleeding time should be determined by Rhodda's method, and if they are prolonged, or if hemorrhages are apparent in other regions of the body, repeated subcutaneous injections of about 30 Cc. of whole blood should be made on the assumption that the intercranial bleeding may be due to hemorrhagic disease. In the writer's experience transfusion has only hastened the fatal termination, since the rise in blood-pressure which results from it has only increased the hemorrhage. Should the diagnosis of intracranial hemorrhage be made, a surgeon skilled in the treatment of cerebral injuries should be called immediately in consultation. The cases operated on have done badly. In all of them, except one, either an extensive bone-flap operation was done, or the anterior fontanel was opened. Should these infants survive the operation, which is rare, hydrocephalus or hernia cerebri is apt to result.

The operation which seems to offer the most hope is the subtemporal decompression. The surgeon's effort should be solely to relieve tension. Search for bleeding points, except when there has been a tear in a single large vessel, such as the superior longitudinal sinus, will be fruitless and a waste of valuable time.

In this condition prophylaxis is all-important. The fetal heart should be under

close observation during the entire first and second stages, and the obstetrician should stand ready to terminate labor, should it show any alarming variation.

Symptomatology and Diagnosis of Foreign Bodies in the Air and Food Passages.

CHEVALIER JACKSON (*American Journal of the Medical Sciences,* May, 1921) reports on 789 cases in gratifying and instructive detail. He thus summarizes the chief points of his admirable paper:

Foreign bodies lodged in the larynx cause an initial laryngeal spasm which is followed by more or less laryngeal wheezing, croupy cough, and a variable degree of impairment of phonation. Pain in the laryngeal region may be present and is sometimes referred to the ears. The larynx may tolerate a thin, flat foreign body for a relatively long period of time, but the development of increasing dyspnea renders early removal imperative in the majority of cases.

Tracheal foreign bodies are usually movable, and their movements can usually be felt by the patient. The vibrations may be palpated and heard with the stethoscope. Cough is usually present at once, may disappear for a time and recur, or may be continuous, and may be so violent as to induce vomiting. Sudden shutting off of the expiratory blast and phonation during paroxysmal cough is almost pathognomonic of a movable tracheal foreign body. Dyspnea is usually present and is due to the bulk of the foreign body plus the subglottic swelling caused by the traumatism of the shiftings of the intruder. The asthmatoid wheeze is usually present and is often louder and of lower pitch than the asthmatoid wheeze of bronchial foreign bodies. It is heard at the mouth, not at the chest wall. Pain is not a common symptom, but may occur and be accurately localized by the patient.

Early symptoms of irritating foreign body (such as a peanut-kernel) in the bronchus manifest themselves by initial laryngeal spasm almost invariably present with foreign bodies of organic nature such as nut kernel, peas, beans, maize, etc. A diffuse purulent laryngo-tracheo-bronchitis develops within twenty-four hours in children under two years. Fever, toxemia, cyanosis, dyspnea, and paroxysmal cough are promptly shown. The child is unable to cough up the thick mucilaginous pus through the swollen larynx and may "drown in its own secretions" unless the offender be removed.

Lung abscess rapidly forms. The older the child the less severe the reaction. In the early stages an acute obstructive emphysema is present, manifested by: (*a*) Limited expansion; (*b*) muffled tympanitic percussion note; (*c*) markedly diminished or absent breath sounds on the obstructed side; (*d*) many râles and harsh breathing on the free side. The radiograph confirms these signs by showing (*a*) greater transparency on the obstructed side; (*b*) displacement of the heart toward the free side; (*c*) depression and limitation of the diaphragmatic movement on the obstructed side. The time of inhalation of a foreign body may be unknown or forgotten. Cough and purulent expectoration ultimately result, although there may be a protracted delusive symptomless interval. Periodic attacks of fever, with chills and sweats, and followed by increased coughing and the expulsion of a large amount of purulent, usually more or less foul material, are so nearly diagnostic of foreign body as to call for exclusion of this probability with the utmost care. Emaciation, clubbing of the fingers and toes, night-sweats, hemoptysis, in fact all of the symptoms of tuberculosis, are in most cases simulated with exactitude, even to the gain in weight by an outdoor regimen.

Tubercle bacilli have never been found in the bronchoscopic clinic associated with foreign body in the bronchus. It was the only element lacking in a complete clinical picture of advanced tuberculosis. A point of difference was the rapid recovery after removal of the foreign body.

The erroneous statement in all of the

text-books that foreign body is followed by phthisis pulmonalis is an heirloom of the days when the bacillary origin of true tuberculosis was unknown, hence the foreign body phthisis pulmonalis or pseudotuberculosis was confused with the true pulmonary tuberculosis of bacillary origin.

The subjective sensation of pain may allow the patient to localize a foreign body accurately. Foreign bodies of metallic or organic nature may cause their peculiar taste in the sputum. Offensive odored sputum should always suggest bronchial foreign body; but absence of sputum, odorous or not, should not exclude foreign body.

Sudden complete obstruction of one main bronchus does not cause noticeable dyspnea provided its fellow is functionating. Complete obstruction of a bronchus is followed by rapid onset of symptoms. The pleura is rarely involved. Rib resections done for supposed empypema have with one exception shown no pus. The physical signs usually show limitation of expansion on the affected side, impairment of percussion, and lessened transmission or absence of breath sounds distal to the foreign body. The "asthmatoid wheeze" may, if present, be of great diagnostic value. Its absence, however, does not negative the presence of foreign body.

All cases of chest disease should have the benefit of a radiographic study to exclude bronchial foreign body as an etiological factor, and negative opinions should never be based upon any plates except those of the utmost perfection that the wonderful modern development of the art and science of roentgenology can produce. In doubtful cases the negative opinion should not be conclusive until a roentgenologist of long and special experience in chest work has been called in consultation. Even then there will be an occasional case calling for diagnostic bronchoscopy.

Symptoms of pulmonary abscess, or other lung disease, even cough, following within a few weeks of the extraction of teeth, call for exclusion of foreign body in the lung.

There are no absolutely diagnostic symptoms of esophageal foreign body. Dysphagia, however, is the most constant complaint, varying in degree with the size of the foreign body and the degree of inflammatory or spasmodic reaction produced. Pain may be caused by the penetration of a sharp foreign body, by inflammation secondary thereto, by impaction of a large object, or by spasmodic closure of the hiatal sphincter. The subjective sensation of foreign body is usually present, but cannot be relied upon as assuring the presence of a foreign body, for it is present for a time after the passage of the intruder. All of these symptoms may exist, often in most intense degree, from previous violent attempts at removal, and the foreign body may or may not be present. Fluoroscopic study of the swallowing function with barium mixture or capsule will give the location of a foreign body which may not be radiopaque. Anteroposterior and lateral roentgenograms should always be made.

The value of a radiograph after the removal of the foreign body cannot be too strongly emphasized.

Foreign body in the stomach ordinarily produces no symptoms. The roentgenogram and the fluoroscopic study with an opaque mixture are the chief means of diagnosis.

Gastric Ulcer and its Treatment.

MOYNIHAN (*Medical Record*, May 28, 1921) under this title, with his customary happiness of expression, lucidity of thought, and efficiency of action, observes that the stomach is marked off from the duodenum by the pyloric vein and the pyloric white line so distinctly that the possibility of a mistake is certainly less than 10 per cent. Ulcers occurring so near to this upper line as to be entitled to the term "pyloric" form almost 1 per cent of ulcers of the stomach or duodenum. Ulcers on the proximal side are "gastric," those on the distal side of the boundary are "duodenal." There are five duodenal ulcers for every two gastric ones. Gastric ulcers are twice as common in men as in women. The chief symptom

is pain. The chief attribute is regularity. There are periods of intermission longer or shorter, at one period of the year or another; but when the attacks are present the pain, which is then the chief complaint, always displays regularity. It comes after all meals, even light meals; and day after day during the attack. If during the attack a meal is eaten, pain invariably follows. The interval between the taking of the meal and the onset of pain is fairly constant. As a rule the earlier the pain is felt after a meal the nearer is the ulcer to the esophagus. That is to say, if pain comes regularly in one hour or one hour and a half, the ulcer that causes it is in the stomach; it is a prepyloric ulcer. If the pain comes two, three, or four hours after the meal the ulcer lies generally beyond the pylorus. This period of relief of pain after a meal is constant and invariable both in gastric and duodenal ulcers, until stenosis, subacute perforation, or the formation of crippling and embarrassing adhesions takes place.

Where the gastric ulcer simulated duodenal ulcer it was often noted the pain came within one and a half hours of the taking of food; in rather more than four cases in five of duodenal ulcer the pain appeared in two hours or more after food. In most of these the pancreas was eroded. The pain in cases of gastric ulcer often disappears in an hour or less, and may be completely relieved—indeed it generally is before the next meal is due. The pain of duodenal ulcer appearing later generally persists, often with a slowly increasing severity, after the meal is taken. The character of the meal influences the pain. A generous meal of heavy foods causes severe pain to appear at an earlier time in gastric ulcer; it delays the appearance of pain in the case of duodenal ulcer. Smaller meals of soft, pultaceous food, easy of digestion and easily propelled, produce less pain, and the interval of relief brought by the food is longer. An indiscreet and hasty meal, especially of fruits, or salads, or pastry, may give instant and grievous pain. A bland and blameless diet taken in small quantities at brief intervals may reduce the chances of pain appearing or even afford complete relief. In the majority of cases in which there was pain it was said to be on the left side or high in the epigastrium; in some severe types there may be great complaint of pain in the back. In twenty-three cases in which there was a deep excavation in the pancreas consecutive to a subacute perforation of the ulcer on the lesser curvature or posterior wall of the stomach, seventeen patients complained bitterly of the intolerable aching in the back.

About four-fifths of the patients who are found to have gastric ulcers complain not only of pain, but of great prostration, feebleness, or lassitude coming on just at the time when the pain is due. This distressing symptom may be found to have preceded the experience of pain by weeks or months. The periodicity of the two is identical.

Moynihan particularly insists upon the importance of ascertaining the various modifications of the one symptom, pain, the constancy of the sequence—food, comfort, pain, comfort; food, comfort, pain, comfort—is the most important of all the clinical matters concerned with the diagnosis of gastric ulcer. In duodenal ulcer the rhythm is food, comfort, pain; food, comfort, pain, and so on.

Moynihan states that when in the record of any patient suffering from "dyspepsia" there is a story of frequent vomiting of the foods, or even fluid nourishment sparsely taken at once rejected, the thought that gastric ulcer is the cause should be driven from one's mind. The type of history which is commonly heard is rarely present in cases of organic disease of the stomach. The vomiting due to the presence of an ulcer is infrequent, and occurs almost always not immediately after food, but after a shorter or longer interval. The meal at first causes relief, and only after that period of relief does it cause disturbance.

Hematemesis also occurs far less commonly than is supposed. Hemorrhage manifest as melena, or in the vomit, is recorded in less than 25 per cent of cases; in the majority of these the amount of blood lost was trivial, and in many in which "hematemesis" is recorded it is at least doubtful whether blood was in truth present.

When blood is discharged from the stomach either in a fresh state or as "black vomit," it is commonly believed that a chronic ulcer is present. There is a great fallacy in such opinions. That gastric hemorrhage occurs, and occurs profusely, in ulceration both of the stomach and duodenum, is certain; but the number of other conditions that give rise to hemorrhage is so large that the possibility of a gastric ulcer being the source of the blood should not be strongly or exclusively held. For when a patient dies of such hemorrhage a very close examination of the gastric mucosa may reveal the existence of tiny chaps, or cracks, or fissures from which blood has certainly issued. And when in the old days of unwisdom we operated upon such patients and explored the cavity of the stomach the mucous membrane was said to "weep blood;" little trickles of blood could be seen to issue from many points. But these little gaps in the mucosa are not ulcers of the kind that produce symptoms. If a patient has suffered for months or years from dyspepsia, and then is seized with an acute attack of vomiting and hematemesis, and if an operation urgently performed reveals the condition of the mucosa just described, it is the worst of fallacies to connect the dyspepsia with the "ulcer" or ulcers then supposed to be present in the stomach. The ulcer which has caused repeated attacks of indigestion is always a gross lesion, a lesion in which there are present not only the evidences of destruction, but also of defense; around the crater of the ulcer is an area, greater or less, of inflammatory action, and the serous coat of the stomach is plainly involved. If the breaches of continuity which permit the escape of blood in cases of cirrhosis of the liver, splenic anemia, and the toxic conditions which, as a rule, have their origin within the abdomen, are called "acute ulcers," as they often are, it is essential to remember that such ulcers are recognizable by no other clinical evidence than hemorrhage, or in exceedingly rare instances by perforation; they are never the cause of a continuing or recent dyspepsia.

The radiographic method is, in expert hands, the one certain method of diagnosis, and is now an indispensable addition to the older and far less accurate methods of inquiry.

If, for example, a patient has had a type of dyspepsia which has led to a diagnosis of gastric ulcer and an operation is performed, the stomach may show no scar, nor can any examination, however careful, display the ulcer whose presence was predicted. If, however, the stomach is closely inspected before it is handled, the following conditions may be seen: the pyloric part of the stomach is decidedly redder than natural —there is a "pyloric blush." That part of the stomach is soon observed to contract eagerly and vigorously; sometimes the spasm is so severe and so prolonged that there may be a suspicion of a tumor, but by degrees the spasm relaxes and the parts become supple again. The spasm may be irregular, now at one part, now at another; now slow and deliberate, now fugitive. Along the greater curvature the glands are enlarged. When these three conditions are seen the prophecy may be confidently made that the stomach is healthy and that the appendix (or one of its neighbors in the alimentary canal) is diseased. In such cases gastroenterostomy has often been performed, sometimes, it is curious to note, with benefit, but as a rule with disastrous effects.

The stomach is an organ full of sympathy for other sufferers. Hardly any of the viscera connected with the intestine, or the bowel itself, can be affected without the stomach playing its part in the disturbance also. This it does by pouring out an excess

of secretion and by tumultuous and irregular activities. It speaks so loudly that its voice only is heard. Its tears of sympathy are spoken of as hyperchlorhydria.

The surgical treatment of a chronic gastric ulcer may call for the performance of any of the following operations: Gastroenterostomy; excision; gastroenterostomy combined with (*a*) excision, (*b*) cauterization (Balfour); gastroenterostomy combined with jejunostomy (Moynihan); median resection of the stomach—"sleeve resection;" partial gastrectomy.

Moynihan's choice of operation now always falls upon partial gastrectomy, whenever it can with reasonable safety be performed. The risk is not great: over a period of ten years it is less than 2.5 per cent. All things considered, and account being taken of the five years succeeding operation, it is probably a safer operation and is certainly more immediately satisfactory than gastroenterostomy alone. It cannot always be practiced. The condition of the patient may forbid it. The ulcer may be so large and so placed as to make removal a matter of so great technical difficulty that the immediate hazards are unfair to the patient. But as experience grows the number of such cases diminishes.

The details of the operation of gastrectomy are briefly these: The duodenum is divided just beyond the pylorus, after ligature of the pyloric and gastroduodenal arteries. An opening is made in the transverse mesocolon, in the arch of the anastomosis of Riolan, in order to guide the surgeon in his ligature of the omentum below the greater curvature, so that the middle colic artery may be avoided, and in order that the conditions at the back of the stomach may be early and fully investigated. After division of the great omentum as far toward the left as the point at which the stomach is to be divided, the whole organ is turned over to the left edge of the parietal wound, until the coronary artery is brought into view and ligatured with great ease at exactly the place required. As soon as this vessel is cut an anchor is "let go," and the stomach is moved more freely. Then, while the stomach is held as a retractor, an anastomosis is made between it and the jejunum. Moynihan now always applies the end of the stomach to the side of the jejunum.

In his early cases he twice encountered a little difficulty in making the jejunum so apply itself to the stomach as to avoid a kink at the upper end of the anastomosis. In both cases some bilious vomiting occurred. In order to prevent this he now usually divides the jejunum completely across, about 6 or 8 inches below the duodenojejunal flexure, closes the distal end, applies the side of the closed distal end to the cut end of the stomach, and then unites the proximal end to the side of the distal end about 4 inches below the stomach, thus making an anastomosis in "Y." This takes a few minutes longer, but the expenditure of time is worth while. Time is saved when the stitches which close the opening in the mesocolon are applied round the suture line; by this method they are easily and quickly inserted. The results are excellent. The condition after operation is remarkably good; in almost all cases the patients have the most tranquil progress that one could wish. And not one single case he has ever operated on has had a recurrence of the ulceration. Once the convalescence is complete the history is without incident.

Postoperative Morbidity in its Relation to Anesthesia.

Anesthesia was for years accepted as an unqualified boon to humanity, so that little attention was paid to its comparatively small morbidity or mortality. That there were unfortunate results attributable directly to the anesthetic is generally acknowledged, and as different anesthetics were discovered and employed upon a large number of patients it was observed that mortality and morbidity were greater for some than for others. Thus as a result of clinical experience ether gradually replaced chloroform, and incident, however, to not only clinical

evidence, but to careful biochemical studies, ether is being replaced by nitrous oxide and local anesthesia.

In this relation THOMPSON *(Edinburgh Medical Journal,* June, 1921), reviewing the whole subject in its present phases, observes that nausea with or without vomiting constitutes the most frequent morbid state following general anesthesia.

The question as to whether postoperative nausea and vomiting have a causal relationship with acidosis is important practically. If the reduction of the alkali reserve is the cause of the nausea and vomiting, the administration of bicarbonate of soda in sufficient quantities previous to operation should obviate the condition. The reduction in the alkali reserve is in the majority of cases a temporary one.

Experience with cases in which bicarbonate of soda has been administered as a routine measure for forty-eight hours preceding operation points fairly strongly to the presumption that the incidence of nausea and vomiting is thereby reduced.

There can be little doubt that, although the cause of the vomiting, etc., is probably of central origin, an excessive secretion of mucus and saliva must at least aggravate the tendency to vomit. Adequate administration of atropine will obviate this in the great majority of cases. Morphia also will help by reducing the amount of the general anesthetic required, and, by calming the patient, will facilitate a smooth induction.

It is generally admitted that a nitrous-oxide-oxygen anesthesia, with or without the judicious addition of ether, is followed by less postoperative nausea and vomiting than is the case after the use of ether or chloroform.

It will be readily admitted that in the absence of a careful attention to detail the patient is liable to be subjected to distinct risks of chilling and depression of vitality, and that one of the effects of this, especially in a person predisposed to chest trouble, may be the development of a patch of pneumonia, or congestion, or a bronchitis. Having granted this, there can be little doubt that the anesthetic does play a part in postoperative chest conditions, and that in this connection ether is the agent most to be feared.

It would seem to be important: (1) To hesitate before giving ether for any time to a patient suffering from or who has recently suffered from such lung trouble as bronchitis. (2) To be sure that the ether is pure and prepared for purposes of anesthesia. (3) To guard against the possibility of chill.

The most important aspect of the question of postoperative morbidity in its relation to general anesthesia concerns itself with the part played by the general anesthetic in those cases in which there is a greater or less degree of shock at the time of the commencement of the operation, or in which, through the severity of the operation or a complication such as hemorrhage, shock becomes established.

Acidosis in the sense of a simple reduction of the bicarbonate of the blood plasma is not the cause of shock or an important factor in its production.

The progressive uncompensated fall in the alkali reserve is a symptom of a deficient capillary circulation and not a cause of such.

The progressive underlying factor in the pathology of surgical shock is a prolonged and progressive fall in blood-pressure.

The causes which may inaugurate the fall of blood-pressure are various: some are nervous, some clinical. Hemorrhage and the absorption of toxic products from injured tissues are powerful collateral and sustaining factors in the production of shock.

Cold is probably an important factor in effecting a delay in the capillary situation, and when long continued it depresses all the body functions.

With the establishment of a low blood-pressure, something of the nature of a vicious circle comes into play. The prolonged hypotension leads to suboxygenation of the body tissues, and a capillary stasis. The capillary stasis reduces the amount of circulating fluid, and the suboxygenation of the tissues results in the appearance of various toxic products from imperfect

tissue metabolism. All of these collectively further reduce the blood-pressure, and so the vicious circle goes on. It will continue to a fatal issue unless some link in the chain is broken and the error of the blood-pressure overcome.

In a series of cases reported by Cannon, of men operated upon whose CO_2 capacity was below 50 per cent at the time of operation, or below it at the end of anesthesia, "the average drop in CO_2 capacity at the end of operation was twice as great as that reported by Caldwell and Cleveland in ordinary civil cases. The fall was greater, too, the lower the original capacity. In other words the more marked the acidosis, the more sensitive is the patient to operative procedures, and the more likely is he to be let down by them into a region of danger. Also there was a striking fall of blood-pressure as the result of operation in these cases."

Crile experimentally found that under approximately equal trauma the changes in the brain cells were approximately three times as great under ether as under N_2O-O anesthesia. Whatever view one takes of the brain-cell changes referred to, it is justifiable to take them as an index of the blood-pressure in the brain. Crile also found that the fall in blood-pressure was on the average two and a half times greater under ether than under N_2O-O, and that the condition of the animal was worse after trauma under ether than after equal trauma under N_2O-O anesthesia.

He concluded, therefore, that while the brain-cell changes resulting from a surgical operation are not due to the inhalation anesthetic *per se*, yet their extent is to a considerable degree determined by the anesthetic which is used. As these changes are less marked under N_2O-O than under ether, the former should be the inhalation of choice.

Cannon, in the summary of his paper on acidosis in cases of shock, etc., states that "operation on men suffering from shock and acidosis results in serious and rapid sinking of arterial pressure when it is already low, and a marked and sudden decrease in the alkali reserve of the blood when that reserve is likewise already low. This change may not occur if N_2O-O anesthesia instead of ether is employed, but that anesthetic affords no guarantee against the ominous decline."

If one accepts these findings one is justified in concluding:

That the anesthetic *per se* is capable of adversely affecting the condition of the patient in operative procedures on shocked patients.

That the choice of the anesthetic agent used may be a matter of importance. The latter conclusion involves the question of the superiority of N_2O-O anesthesia in such cases, at any rate over such general anesthetics as ether and chloroform.

Any one who has read Cannon's work on "The Bodily Changes in Fear, Hunger, Pain, and Rage," will realize what a profound effect such emotions as fear and pain may have on the secretions of the body. Biologically considered, such effects are protective, but in the abnormal conditions of a patient about to be operated on this result on the patient may be very harmful. Crile was among the first to emphasize the importance of the emotional factor, and to insist on the necessity of avoiding its operation as far as possible.

The treatment aimed at accomplishing this is simple enough, and consists in a general way of reassuring the patient, treating him with gentleness and consideration, and in dulling his sensibility by such drugs as morphia and scopolamine. As Crile puts it, "No detail is too petty."

By the preoperative administration of sodium bicarbonate the alkaline reserves of the body can be greatly increased even in unfavorable circumstances. Since acidosis develops in shock and involves a definite risk when operation is undertaken, its avoidance should be sought. The recommendation is offered that wounded men be provided with a warm drink containing a drachm or 4 grammes of sodium bicarbonate at suitable relay posts on their way from the front to casualty clearing stations.

Further, when an alkaline injection is

given at the start of an operation "it prevents the dangerous depressive effects which the anesthetic and operative procedures have on cases of shock with acidosis. The operation ends not with an increase of the existent acidosis, but with the acidosis overcome and a normal alkaline reserve provided, and the blood-pressure instead of being lowered is actually raised during the critical period."

With regard to the measures for restoring an efficient circulation, certain points may be noted: Transfusion of whole blood is probably the measure likely to have a successful result in the largest proportion of cases, provided its application is not unduly delayed.

The Mobile V Colon.

DR. ELIZA MOSHER *(New York Medical Journal,* May 18, 1921) under this title describes certain deviations of the colon due to weakness of the abdominal walls and to other conditions which favor general visceroptosis. It is stated that the condition is not difficult to diagnose. The author summarizes her article as follows:

A more or less acute angle is liable to form in any part of the transverse colon where there is localized weakness of the abdominal wall. Because this bend resembles the letter V it has been termed the V colon.

In moderate degree this bend is of common occurrence—in extreme degree, occasional.

Its consequences are far reaching. It slowly undermines the health by causing stasis in the bend and in the section of colon behind it.

Recognition of the V colon is easy by auscultation percussion, but more difficult with bismuth enema, because of the tendency of the latter to mechanically straighten the bend as it fills the tranverse colon.

Temporary correction by slow, sighing expirations, elevation of legs, and other measures can be quickly accomplished.

Permanent correction can be made by applying a simple supporting belt, and by the faithful and persistent use of exercises calculated to draw the recti muscles together and to strengthen the entire musculature of the abdominal wall.

The Treatment of Surgical Tuberculosis in Children by Venous Hyperemia.

In a leading article in the *Medical Record* of June 11, 1921, this question is set forth as follows:

In children the induction of venous hyperemia is not only quite equal to any other modern method of treatment of white swelling of the knee-joint, with the exception of heliotherapy, but it is distinctly superior in many respects. The rapid sedation of pain is one of the first results when the procedure is properly employed. The bed position assumed by the involved limb improves spontaneously as soon as the pain disappears. The possibility of carrying out the treatment without the use of casts or other means of immobilizing the limb avoids the development of trophic disturbances of the skin, muscles, and bone. Finally, when other therapeutic measures—always excepting heliotherapy—usually end in more or less complete ankylosis (which is even yet regarded as an ultimate aim), venous hyperemia preserves the joints as well as their movement, and this is not uncommon, but almost invariably the rule. Therefore it should be given a high place in infantile surgical therapeutics in which conservative measures are all-important. Added to these advantages treatment by venous hyperemia is absolutely inoffensive when rightly carried out.

The accidents attributed to it are invariably due to a defective technique. Muscular atrophy at the point of application of the elastic band, chronic edema, and, exceptionally, gangrene have been recorded, but they are always the result of a too tight application of the band. Acute suppuration in the sinuses or in tuberculous abscesses may also ensue from the ischemia caused by a too tight ligature, and tuberculous lesions appear to be particularly aggravated by this ischemia or by an exaggerated edema which produces a too in-

tense or prolonged stasis. Consequently it is of the utmost importance to watch for the slightest symptoms accruing from too energetic compression and to remedy this immediately. For this reason the simultaneous application of the elastic band and cups should always be avoided as they produce an excessive stasis over the bacillary lesion itself.

As to the manner of action of venous stasis one is reduced to hypotheses, each of which probably has a certain value, but no one taken singly is sufficient to give a satisfactory explanation. It must be admitted that the true modus operandi of the procedure still remains to be explained, but the numerous excellent—even exceptional—results plead in its favor. Its use is indicated at the onset of white swelling of almost any joint when the lesions are especially in the periarticular soft parts, and in osteitis with or without sinuses, when the bone lesion is superficial. Venous hyperemia can also be used to complete the results of a surgical interference on the bones. Like all other conservative measures this one is contraindicated in very advanced tuberculous lesions of the bones and in rapidly developing osteoarthritis, when it is desirable to prevent the occurrence of visceral degeneration by resorting at once to a radical operation.

Reviews

THE OXFORD MEDICINE. Edited by Henry A. Christian, A.M., M.D., and Sir James Mackenzie, M.D., F.R.C.P. Six volumes, illustrated. Volume IV. The Oxford University Press, New York and London, 1921.

In previous issues we have called attention to the preceding volumes. The fourth volume has just come to hand and deals with diseases of the lymphatic system, metabolism, the locomotor apparatus, industrial diseases, and infectious diseases. A surprisingly large number of American authors have taken part in the preparation of this volume; among them being Riesman, Sailer and McCrae of Philadelphia, Joslin of Boston, Rowntree of Minneapolis, and Miller of Chicago. The articles upon Cholera and Malta Fever are by Heiser, and one better qualified could not have been found. In the treatment of typhoid fever we are glad to note that Dr. Miller emphasizes the importance of a liberal diet in place of the scanty diet which a few years ago was so commonly followed. 'We note with interest his statement that the rigid Brand method of treating typhoid fever is used only to a very limited extent in this country and that modified hydrotherapy is quite generally applied. Again we note with a good deal of interest his statement that we do not possess evidence of the beneficial results of the Brand bath. We had supposed that there were few therapeutic measures which have so large an amount of information attached to them of a reliable nature. The whole point in regard to the Brand bath, as we have repeatedly pointed out, is not so much the temperature of the water or the immersion of a patient in the tub as it is the establishment of circulatory equilibrium and reaction by the proper use of water at different temperatures according to the patient's needs.

Naturally, considering the amount of work which Dr. Miller has done in connection with the action of foreign proteins, he devotes some space to this subject and its application to typhoid. We are glad to see that he maintains a rational attitude concerning it, stating that it should be used with great caution, and that if further observations show that it lowers mortality and is free from danger, it will be a definitely valuable therapeutic agent.

The volumes of Oxford Medicine, it will

be remembered, are bound in such a way that additional pages can be rapidly inserted by the purchaser when additional information due to the advance in medicine comes to hand.

We think that Volume IV is the most satisfactory of the series, so far as usefulness is concerned.

THE INTERNATIONAL MEDICAL ANNUAL. A Yearbook of Treatment and Practitioners' Index. William Wood & Company, New York, 1921. Price $6.

This is the thirty-ninth year in which the International Medical Annual has appeared, and our readers will recall that for all of these years the GAZETTE has called their attention to it. It is made up of abstracts prepared by different physicians and surgeons in this country and abroad, the majority, of course, being English.

It opens with an introduction by the editor, whose name, curiously enough, does not appear on the title page, although the names of the associate editors so appear. Following this, Professor Charteris of St. Andrews provides, in the brief space of thirty-nine pages, a summary of therapeutics for the past twelve months.

As in previous years the remaining portion of the volume consists in abstracts from current medical literature arranged in alphabetical order, beginning with abdominal surgery and ending with yellow fever.

An appendix dealing with orthopedic surgery, prepared by Drs. Albee and Carter of New York, closes the volume, their manuscript having been delayed in transit from the United States so that it could not be placed in its regular position.

A MENTAL HOSPITAL MANUAL. By John Macarthur, M.R.C.S., L.R.C.P. Oxford University Press, New York and London, 1921. Price $5.25.

This is a book of 215 pages which is definitely described in its title. In other words, it is an endeavor to place before junior medical officers in mental hospitals or insane asylums those methods of treating the insane which experience has proved to be satisfactory. The author claims that nothing in the way of treatment has been recommended which has not stood the test of experience, and he well points out that the practice of medicine in such an institution is very different from the practice of medicine amongst those who are mentally competent. He begins with a chapter upon the Mental Hospital, as he calls it, and then proceeds to a consideration of the Duties of the Assistant Medical Officer, devoting his third chapter to the Treatment of the Insane, including physical as well as medicinal remedies, a subject which is continued in his fourth chapter. In the fifth chapter he deals with the surgical conditions which may arise in the insane, and then proceeds to discuss the care of patients with defective habits, the discharge of patients apparently cured, and lastly, in chapters twelve and thirteen, he discusses the English laws governing insanity, the statutory books and laws, the character of evidence to be taken by medical officers at inquests, and the forms which should be used in meeting the law in connection with autopsies and the reporting of deaths. In this portion of the book schedules and forms best suited to hospital management for the insane are also included. The book is one which will prove valuable and interesting to those who are devoting themselves to this line of work.

INDEX CATALOGUE OF THE LIBRARY OF THE SURGEON-GENERAL'S OFFICE, UNITED STATES ARMY. Third Series, Volume II. ARNAL-BLONDOT. Government Printing Office, Washington, 1920.

This is the second addition to the alphabetical list of abbreviations of titles of medical periodicals published in the twenty-first volume, second series, of the Index Catalogue. The Catalogue is known in scientific circles all over the world as being one of the most important contributions to science, with particular reference to medicine, that has ever appeared in any land. We learn from the letter addressed to the Surgeon-General by General Noble of the Medical Department of the Army that this second volume of the third series of the Index Catalogue represents 2644 volumes, 4389

pamphlets, and 29,504 titles of articles in periodicals. We also learn that the Library of the Surgeon-General's Office now contains 198,900 bound volumes, 35,092 unbound volumes, and 361,455 pamphlets, together with 56,031 portraits of physicians and 136 medical engravings and prints, and 316 medical caricatures. Exclusive of the Transactions of Societies, the number of current periodicals on file in the library is 1568, of which 1480 are kept upon the shelves in the reading room; and last of all, the encouraging information is given that through the opening of channels of communication with Germany and Austria most of the medical periodicals of those countries covering the years 1915-18 have been received and are being indexed as rapidly as possible. No medical periodicals have been received from Russia or the Balkan countries since our entry into the war.

A Text-book of Medical Jurisprudence and Toxicology. By John Glaister, M.D., D.P.H., F.R.S.E. Fourth edition, illustrated. William Wood & Company, New York, 1921. Price $7.50.

The third edition of Dr. Glaister's well-known book appeared in 1915 and the second in 1910. In all these editions he received the assistance of Scottish lawyers who were best prepared to discuss problems of a medicolegal nature, and, therefore, the book may be said to be well rounded out in that its text has been prepared from two points of view. The material, which is new in the present edition, deals chiefly with industrial and other poisons, the relationship of toxicology to the responsibility for crime, and changes in lunacy laws. It contains a little over 900 pages and is provided with a very copious index. There is one colored plate and 137 illustrations, and by the use of unusually small type an immense amount of information is embodied, the small type being used in the description of typical cases and for other material which is not considered of first importance.

It is some time since any new work upon medicolegal matters has appeared in this country, and we can cordially recommend this volume not only to those of the profession who occupy official positions in connection with medicolegal matters, but to those who may be called upon for ordinary or expert testimony in the courts.

Prosthetic Dentistry. By Douglas Gabell, L.R.C.P., M.R.C.S., O.D.S. Oxford University Press, New York, 1921. Price $4.25.

In the space of less than 250 pages of rather large type with 58 illustrations, the author of this book gives fairly minute instruction as to the problems presented in the practice of prosthetic dentistry, including a consideration of the artistic anatomy of the lower part of the face and the details which are essential to successful work. The text is divided into eleven chapters. Needless to say it is essentially a book for dentists and not for physicians.

Essays on Surgical Subjects. By Sir Berkeley Moynihan, K.C.M.G., C.B. Illustrated. W. B. Saunders Company, Philadelphia and London, 1921. Price $5.

This series of essays collected in book form and most gracefully dedicated to W. J. and C. H. Mayo and his Friends at the Mayo Clinic, contains The Murphy Memorial Oration, The Ritual of Surgical Operation, The Diagnosis and Treatment of Chronic Gastric Ulcer, Disappointments After Gastro-Enterostomy, Intestinal Stasis, Acute Emergencies of Abdominal Disease, The Gifts of Surgery to Medicine, The Surgery of the Chest in Relation to Retained Projectiles, and The Most Gentle Profession, this last caption indicating, as might be expected, an address to the Nursing Staff of the Leeds General Infirmary on the distribution of prizes in January of this year, in which occur the words, "Gossip tainted with slander is the last and meanest infirmity of empty minds."

Probably with all of these papers every leading surgeon in the country is broadly familiar, nor is there one of this group who will not welcome the book as making readily available the teaching which he has learned to accept as authoritative, the writing which he recognizes as peculiarly clear and vivid.